02-8904-06-PA
REV. NO. 0

FINAL DRAFT
PRELIMINARY ASSESSMENT
EIGHTH STREET SITE
JERSEY CITY, NEW JERSEY

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8904-06
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

JUNE 9, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

RICHARD FEINBERG
PROJECT MANAGER

EDMUND KNYFD JR.
SITE MANAGER

REVIEWED/APPROVED BY:

RONALD M. NAMAN
FIT OFFICE MANAGER

572911

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. **Site Name/Alias** Eighth Street Site/aka G. K. Yedibalian Inc. Hardware Shop/aka Modern Village Development Corp.

   Street 379-383 Eighth Street

   City Jersey City **State** New Jersey **Zip** 07302

2. **County** Hudson **County Code** 17 **Cong. Dist.** 14

3 **EPA ID No.** NJD982274250

4. **Latitude** 40° 43′ 37″N **Longitude** 74° 03′ 05″W

   USGS Quad. Jersey City, New Jersey

5. **Owner** Carl Yedibalian **Tel. No.** (201) 656-2377

   Street 377 Eighth Street

   City Jersey City **State** New Jersey **Zip** 07302

6. **Operator** Carl Yedibalian/Modern Village Development Corp. **Tel. No.** (201) 656-2377

   Street 377 Eighth Street

   City Jersey City **State** New Jersey **Zip** 07302

7. **Type of Ownership**

   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other ______

8. **Owner/Operator Notification on File**

   ☐ RCRA 3001 Date ______ ☐ CERCLA 103c Date ______
   ☐ None ☒ Unknown

9. **Permit Information**

Permit	Permit No.	Date Issued	Expiration Date	Comments
Unknown				

10. **Site Status**

    ☒ Active ☐ Inactive ☐ Unknown

11. **Years of Operation** Unknown to Present

12. **Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.**

(a) **Waste Management Areas**

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Fill	Fill
2	Sump Area	Sump

(b) **Other Areas of Concern**

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

On January 25, 1989, Ms. Patti-Lynn Neilan authored a letter to the EPA requesting that a preliminary assessment be done on this site because of alleged uncontrolled dumping of soil and construction debris. The exact composition of the debris and its location on site are not known, but the material is believed to be trash, construction debris, and soil.

In March 1987 the concrete floor in the warehouse at 383 Eighth Street was removed. At this time it was noted that the slabs of concrete had yellow staining on their undersides. The concrete debris and soil were placed on the adjacent vacant lot at 381 Eighth Street. The waste, classified by the State of New Jersey Department of Environmental Protection as ID No. 27, was properly containerized in five 55-gallon drums and manifested off site on February 26, 1988. It is believed that this site may contain chromium-contaminated fill. Mr. Tex Aldredge of the Jersey City Health Division (JCHD) inspected the new concrete floor and noticed that the concrete block walls of the facility were stained with various colors and showed evidence of crystal growth. Crystal growth was also noticed along the sides of the sump area in the warehouse. Mr. Aldredge requested that the crystalline material be removed and a sealant be applied to the walls to prevent further "wicking" of contaminants from the soil. An EP toxicity test performed on the crystalline substance from the warehouse verified the presence of chromate. An air sampling program was performed at the warehouse, and the results showed no detection of chromium.

13. **Information available from**

Contact Amy Brochu **Agency** U.S. EPA **Tel. No.** (201) 906-6802

Preparer Edmund Knyfd Jr. **Agency** NUS Corp. Region 2 FIT **Date** 6/30/89

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 1 - Fill Fill

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   The RCRA status and permit history, if any, are unknown. Some time between March 1987 and March 1988 Mr. Yedibalian applied for and received an EPA ID Number to remove the chromium-contaminated soil dumped at 381 Eighth Street. On March 18, 1988, he requested that the site be reclassified as it no longer needed the ID number. The age of the waste unit is unknown, but estimated to be a few years old.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   From the off-site reconnaissance report it can be determined that the waste unit is the entire lot since the soil, construction debris, and trash are scattered all over the entire lot.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   From the tax map it is estimated that the size of the waste unit is 2,500 to 7,500 ft^2 consisting of three lots, each of which measures 25 by 100 feet in size. Five 55-gallon drums of hazardous substances were manifested off site on February 26, 1988.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   The physical state of the waste type as disposed of in the waste unit can be categorized as solid, consisting of concrete, trash, and potentially chromium-contaminated soil.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   The specific hazardous substance suspected to be present in the waste unit is chromium. An air sampling report conducted for this site as part of the Hudson County Chromium Sampling Project stated that the warehouse building was originally constructed on a site which was suspected of containing chromium-contaminated fill.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   Evidence gathered during the off-site reconnaissance indicates that there appear to be no containment measures of any type. There is a potential for contaminant migration via groundwater by way of downward percolation of rainwater through the soil to the groundwater. There is a potential for contaminant migration via surface water when heavy rainfall overflows the local storm sewer system, at which time surface runoff would migrate east down the streets, and into the Hudson River at Harsimus Cove. Contaminant migration via an air route is of concern to the area residents and could occur because the potentially chromium-contaminated soil is unprotected from the wind.

Ref. Nos. 1, 6, 18, 22, 23

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 2 - Sump Area Sump

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   The RCRA status and permit history, if any, are unknown. The age of this waste unit is unknown, but estimated to be a few years old.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The sump is located in the floor of the warehouse facility at 383 Eighth Street.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   The size and quantity of the waste unit are unknown. The specific quantities of hazardous substances in the waste unit are unknown, but the substances are observed to be crystal growth on the sides of the sump.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   The physical state of the waste type as disposed of in the waste unit can be categorized as solid, in the form of crystals.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   The specific hazardous substance suspected to be present in the waste unit is chromium, attributable to suspected chromium-contaminated fill underneath the warehouse facility at 383 Eighth Street.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   It is believed that the sump area is sunken and completely surrounded by the concrete floor. If the sump area is used as a collection area for water, it is possible for contaminants to migrate from the surrounding soil into the sump area. This is evidenced by observed crystal growth on the sides of the sump area, which could represent the potential for contaminant migration via groundwater. There might be a possibility for contaminant migration via surface water if the sump area were to overflow, allowing water to flow onto the floor and possibly out of the warehouse facility into the street and city sewer system. The potential for contaminant migration via an air route is believed to be low since the suspected hazardous substance has been observed as crystals on the sides of the sump area.

Ref. Nos. 22, 23

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

There has been no observed or alleged release of contaminants to the groundwater. However, the potential for groundwater contamination does exist because it appears that there is no containment of the waste debris piles. The suspected contaminant is believed to be chromium-contaminated soil removed from underneath the warehouse floor at 383 Eighth Street and dumped on the adjacent vacant lot at 381 Eighth Street. There is also concern that chromium-contaminated soil may have been used as fill on the site. There could also be a potential for a release of contaminants to the groundwater in the sump area of the warehouse facility, as evidenced by yellow crystal growth on the sides of the sump area. The suspected contaminant is chromium.

Ref. Nos. 1, 2, 20, 21, 22

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

In Jersey City the aquifer of concern is the Triassic Age Brunswick Formation of the Newark Group. The beds of the Newark Group generally strike in a northeast-southwest direction and dip gently to the northwest at approximately 10 degrees. The Brunswick Formation, estimated to be about 6,000 to 7,000 feet thick in the Newark area just south of the Hackensack River basin, is composed of reddish-brown shale, sandstone, siltstone, conglomerate, and intervening beds of basalt and diabase. Overlying the Brunswick Formation in some areas are Pleistocene Age glacial deposits. These glacial deposits typically consist of sand, gravel, clay, and silt, and are commonly classified as till or stratified drift. The till is generally an unsorted mixture of gravel, sand, silt, and clay, whereas the stratified drift consists of poorly to well sorted sand, gravel, clay, and silt. Locally, where these deposits do exist, they are believed to range in thickness from a few feet up to 50 feet. The Brunswick Formation is of generally poor permeability; however, systems of cracks and fractures can yield appreciable amounts of water in the direction parallel to the strike of the formation beds. Stratified drift deposits are commonly in direct hydraulic connection with the Brunswick Formation, and are a zone of recharge to the formation. Wells in the Brunswick Formation yield water at depths less than 200 feet to as much as 600 feet, with the most productive range being from 200 to 400 feet deep. Groundwater flow is believed to be parallel to the northeast-southwest strike of the formation beds, but heavy industrial pumpage is probably reversing the natural groundwater flow and inducing poor-quality water from the Hackensack River into the aquifer. There is very little useful well information for Jersey City and Hudson County, but available information indicated that a well, located less than 0.25 mile from the site, was drilled to a depth of 99 feet and did not yield water.

Ref. Nos. 4, 28

3. **Is a designated sole source aquifer within 3 miles of the site?**

No, a designated sole source aquifer is not within 3 miles of the site.

Ref. No. 5

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

It is believed that the waste disposal/storage is the first few feet, in depth, of soil present on site. The depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern cannot be determined from the available well information; however, a well located approximately 1 block north of the site was drilled to a depth of 99 feet and did not yield water. It is estimated that the groundwater level is deeper than 99 feet.

Ref. Nos. 18, 22, 23, 27

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

The estimated permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern is 10^{-3}-10^{-5} cm/sec for stratified drift.

Ref. No. 7

6. **What is the net precipitation for the area?**

The net precipitation for the area is 14 inches annually.

Ref. No. 7

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

In Hudson County and the Jersey City area, tidal flooding of the Meadowlands and the high chloride content of the Hackensack River greatly influence the local groundwater quality and make it unsuitable for most municipal and industrial processes except cooling.

Ref. Nos., 4 p. 29; 6

8. **What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?**

There are no wells used for drinking or irrigation purposes within 3 miles of the site. A well located approximately 1 block north of the site was drilled to a depth of 99 feet and yielded no water.

Distance NA **Depth** NA

Ref. Nos. 3, 27

9. **Identify the population served by the aquifer of concern within a 3-mile radius of the site.**

There is no population served by the aquifer of concern within a 3-mile radius of the site. Due to the poor quality of the groundwater, all residents of Jersey City receive their drinking water from distant water supplies such as the Boonton and Wanaque Reservoirs. A portion of the population within a 3-mile radius of the site resides in Manhattan, New York. This population receives its drinking water from the New York City Aqueduct System, which consists of lakes and reservoirs in Westchester, Putnam, Ulster, Schoharie, Delaware, and Sullivan counties.

Ref. Nos. 3; 4, pp. 28-29; 6; 8; 9; 10; 11

SURFACE WATER ROUTE

10. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.

There has been no observed or alleged release of contaminants to surface water attributable to this site. However, a small potential does exist for contaminants to migrate to surface water (Hudson River) when the city sewer systems become flooded during periods of heavy rainfall, causing surface water runoff into the Hudson River. The substances found on site include trash, construction debris, and potentially chromium-contaminated soil.

Ref. Nos. 2; 4, pp. 26 and 52

11. Identify and locate the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.

The nearest downslope surface water would be the Hudson River at Harsimus Cove. It appears that surface water drainage patterns from the site would go to street sewers, on to a treatment plant, and then discharge into the Hudson River. During periods of heavy rainfall the street sewers become flooded, and surface water runoff is into the Hudson River.

Ref. Nos. 4 pp. 26 and 52; 6; 19

12. What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)

The facility slope, estimated from the 3-mile radius map, appears to be less than 1 percent. During the off-site reconnaissance it was noted that the slope of the site was gentle, away from Eighth Street to the south.

Ref. Nos. 6, 18

13. What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)

The intervening terrain slope, estimated from the 3-mile radius map, appears to be less than 1 percent.

Ref. No. 6

14. What is the 1-year 24-hour rainfall?

The 1-year 24-hour rainfall for this area is 2.8 inches.

Ref. No. 7

15. What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.

The distance to the nearest downslope surface water is approximately 4500 feet east to the Hudson River.

Ref. No. 6

16. Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).

In the Jersey City area surface water within 3 miles downstream of the site is subject to tidal influence. The Hudson River and upper Newark Bay are used for commercial shipping and some secondary contact recreation such as boating. The Hackensack River is generally unused and not fishable due to restrictions imposed by the New Jersey Department of Environmental Protection. These waters have been classified by the State of New Jersey Department of Environmental Protection, Division of Water Resources to be used for, among other things, the maintenance and migration of diadromous fish.

Ref. Nos. 12, 13, 24, 25, 26

17. Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.

Because surface water in the area is tidal, consideration should be given to wetlands upstream and downstream of the site. There are no wetlands within 2 miles upstream or downstream of the site. However there is a tidal flat approximately 2.5 miles south of the site, and a portion of the Hackensack Meadowlands is within a 3-mile radius of the site.

Ref. Nos. 6, 14

18. Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.

Because surface water in the area is tidal, consideration should be given to critical habitats of federally listed endangered species upstream and downstream of the site. There are no critical habitats of federally listed endangered species within 2 miles of the site along the migration path. However, the Hackensack River and Meadowlands are a refuge and nursery area for several important recreational and commercial fish species, including two fish species listed as threatened by the State of New Jersey.

Ref. Nos. 6, 15, 24

19. What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?

Because the surface water in the area is tidal, consideration should be given to sensitive environments upstream and downstream of the site. There are no sensitive environments within 2 miles upstream or downstream of the site; however, a tidal flat exists 2.5 miles downstream of the site, and a portion of the Hackensack Meadowlands is within a 3-mile radius of the site.

Ref. Nos. 6, 14, 15

20. Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).

No surface water intakes exist within 3 miles downstream or upstream of the site.

Ref. Nos. 16

21. What is the state water quality classification of the water body of concern?

The water bodies of concern, the Upper Newark Bay, the Hackensack River, the Meadowlands, and the Hudson River have state water quality classifications of S3, S2, S2, and S2, respectively.

Ref. Nos 12, 13

22. Describe any apparent biota contamination that is attributable to the site.

No apparent biota contamination has been attributed to this site.

Ref. Nos. 1, 18

AIR ROUTE

23. Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.

No observed or alleged release of contaminants to the air has been attributed to this site. It is believed that a potential does exist for the wind to carry contaminated dust off site. The area residents are also concerned that potentially chromium-contaminated dust from the site may be blowing into their residences.

Ref. Nos. 1, 2, 22, 23

24. What is the population within a 4-mile radius of the site?

The population within a 4-mile radius of the site is 774,600. A portion of this area includes Manhattan, NY.

Ref. Nos. 6, 17

FIRE AND EXPLOSION

25. Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.

The potential for a fire or explosion to occur is believed to be nonexistent because the only suspected substances on site are trash, construction debris, and potentially chromium-contaminated soil. There is no evidence of any method of storage or containment associated with these substances.

Ref. Nos. 1, 18, 20, 21, 22, 23

26. What is the population within a 2-mile radius of the hazardous substance(s) at the facility?

The population within a 2-mile radius of the hazardous substances at the facility is 199,700.

Ref. No. 17

DIRECT CONTACT/ON-SITE EXPOSURE

27. Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.

The potential for direct contact is extremely low since the site is enclosed by a high chain link fence with a locked gate. The suspected hazardous substance on site is potentially chromium-contaminated soil.

Ref. Nos. 18, 20, 21, 22, 23

28. How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?

From photographs taken during the off-site reconnaissance it is estimated that approximately 100 residents live on property whose boundaries border the southern boundary of the site.

Ref. No. 18 photographs P. 20 and P. 22

29. What is the population within a 1-mile radius of the site?

The population within a 1-mile radius of the site is 69,000.

Ref. No. 17

PART IV: SITE SUMMARY AND RECOMMENDATIONS

The Eighth Street Site consists of three lots that have a combined area of 7500 ft^2 and occupy the addresses of 379, 381, and 383 Eighth Street in Jersey City, Hudson County, New Jersey. The site is located in an urban residential area where houses border the southern boundary of the site, and across the street, north of the site, are the E.F. Jones Park and Jack De Salvo Memorial Playground.

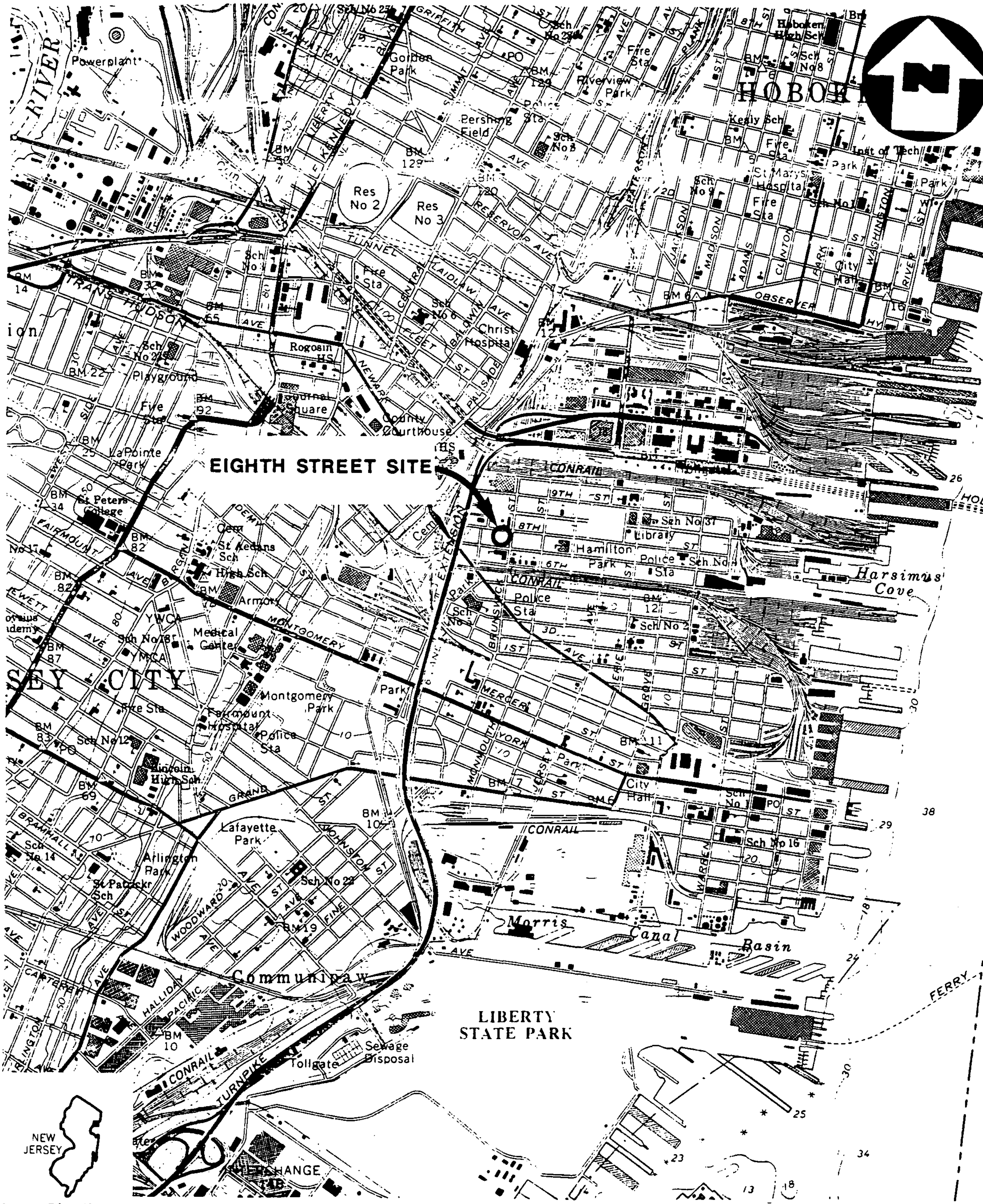
In March 1987 the owner, Carl Yedibalian, replaced the existing concrete floor within his warehouse facility located at 383 Eighth Street. It is believed that the warehouse facility was originally constructed on a site which was suspected of containing chromium-contaminated fill material. During the replacement of the concrete floor in the warehouse it was noticed that the original slabs had yellow staining on the underside. While awaiting waste classification and disposal, the concrete debris was placed on the vacant lot at 381 Eighth Street and covered with plastic. The waste, classified by the State of New Jersey Department of Environmental Protection as ID No. 27, was properly containerized in five 55-gallon drums and manifested off site on February 26, 1988. After the new concrete floor was constructed, Mr. Aldredge of the Jersey City Health Division (JCHD) inspected the facility and noticed that the concrete block walls within the facility were stained with various colored materials and showed some evidence of crystal growth. Mr. Aldredge requested that an air sampling plan be developed to determine the presence of chromium particulates in the facility. Mr. Aldredge requested that the crystalline material be removed and a sealing material sprayed on the walls to prevent further "wicking" of contaminants from the soil underneath the floor. An EP Toxicity test on the leaching crystalline substance verified that chromate was present. An air sampling plan and foundation sealing plan were submitted to Mr. Aldredge (JCHD) for his review and comment. On July 7, 1987, after a meeting with all concerned parties it was agreed to implement the air sampling plan and to seal the walls after the results of analysis were available. The air sampling was performed at three locations in the warehouse: the office area, the back of the warehouse (proposed stock area), and the front of the warehouse (proposed shipping area). Results of the air sampling indicated no detection of chromium.

Area residents have expressed concern that there may still be residual chromium contamination at the site attributable to soil removed from underneath the concrete floor in the warehouse at 383 Eighth Street and dumped on the adjacent lot at 381 Eighth Street, and from soil that may have been used for fill at the site. Based on the confirmed human carcinogenic status of hexavalent chromium, and the close proximity of this site to residences and public playgrounds, a **MEDIUM PRIORITY** site inspection is recommended. Soil sampling should be conducted on the site to determine the extent of any possible chromium contamination. Also, air sampling should be performed around the perimeter of the site to determine if contaminants are migrating off site via an air route.

ATTACHMENT 1

EIGHTH STREET SITE
JERSEY CITY, NEW JERSEY

CONTENTS



(QUAD) JERSEY CITY, N.J.-N.Y.

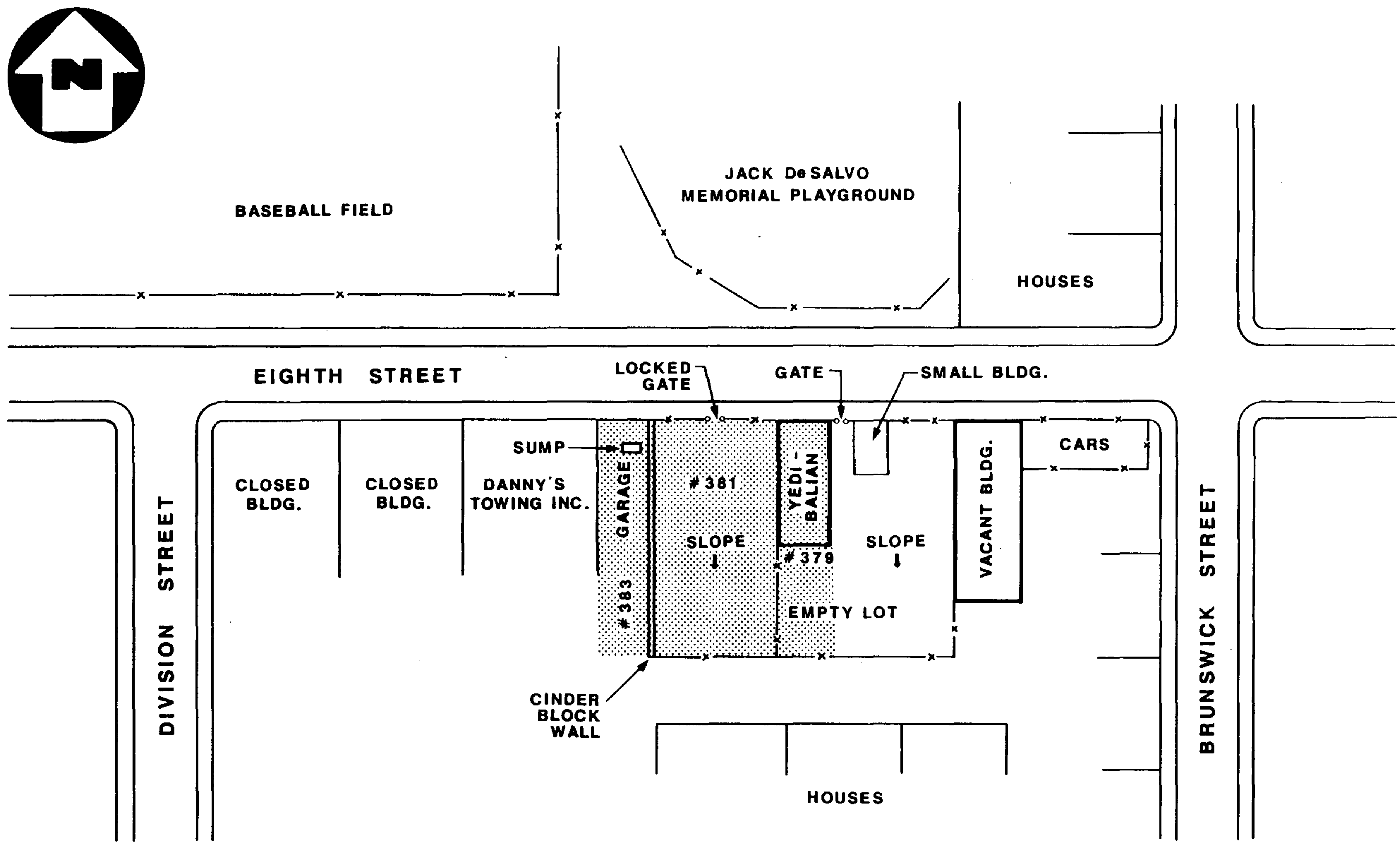
FIGURE 1

SITE LOCATION MAP

EIGHTH STREET SITE, JERSEY CITY, N.J.

NUS CORPORATION

SCALE: 1" = 2000'



LEGEND

SITE PROPERTY

SITE MAP

EIGHTH STREET SITE, JERSEY CITY, N.J.

NOT TO SCALE

FIGURE 2

NUS CORPORATION

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EXHIBIT A

PHOTOGRAPH LOG

EIGHTH STREET SITE
EIGHTH STREET, JERSEY CITY, NEW JERSEY

OFF-SITE RECONNAISSANCE: APRIL 20, 1989

02-8904-06-PA
Rev. No. 0

EIGHTH STREET SITE
EIGHTH STREET, JERSEY CITY, NEW JERSEY
APRIL 20, 1989

ALL PHOTOGRAPHS TAKEN BY PAUL BAUER

Photo Number	Description	Time
1P20	Directly in front of gate looking into lot.	1505
1P21	Corner of Eighth and Brunswick looking southwest at lot.	1510
1P22	From Eighth Street looking southeast at lot.	1514

1P20 April 20, 1989 1505
Directly in front of gate looking into lot.

1P21 April 20, 1989 1510
Corner of Eighth and Brunswick looking southwest at lot.

1P22 April 20, 1989 1514
From Eighth Street looking southeast at lot.

ATTACHMENT 2

REFERENCES

The redacted information consists of names, home addresses and/or phone numbers of private individuals. Disclosure of this information would constitute a clearly unwarranted invasion of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. § 552(b)(6).

1. United States Environmental Protection Agency, Region II, Preliminary Assessment Request from Dennis Santella, Chief, Technical and Pre-Remedial Support Section, to Amy Brochu, FIT-RPO Superfund Support Section, March 13, 1989.

2. Telecon Note: Conversation between [redacted] Author of complaint letter to EPA, and Edmund Knyfd Jr., NUS Corp., April 11, 1989.

3. Telecon Note: Conversation between Mr. Bob Lorfink, Principal Engineer, Jersey City Water Engineering Department, and Edmund Knyfd Jr., NUS Corp., April 11, 1989.

4. Miller, D.W., A Geraghty and Miller Special Report, The New Jersey Ground-Water Situation, Geraghty and Miller, Inc., Groundwater consultants, Hackensack, New Jersey, August 1979.

5. Telecon Note: Conversation between Mr. Drew Baris, EPA Region 2-Office of Groundwater Management, and Edmund Knyfd Jr., NUS Corp., May 18, 1989.

6. U.S. Department of the Interior, Geological Survey Topographical Maps, 7.5 minute series, "Jersey City Quadrangle, NJ-NY", 1967, revised 1981; "Weehawken Quadrangle, NJ-NY", 1967, revised 1981; "Brooklyn Quadrangle, NY", 1967, revised 1979; "Central Park Quadrangle, NY-NJ", 1966, revised 1979.

7. Uncontrolled hazardous waste site ranking system, A user's manual, 40 CFR, Part 300, Appendix A, 1986.

8. New York State Atlas of Community Water System Sources, New York State Department of Health, Division of Environmental Protection, Bureau of Public Water Supply Protection, 1982.

9. Population Estimates for New Jersey, July 1, 1982, Office of Demographic and Economic Analysis, Division of Planning and Research, Department of Labor, Trenton, New Jersey, September 1983.

10. Telecon Note: Conversation between Mr. Joe Locito, Hoboken Water Department, and Edmund Knyfd Jr., NUS Corp., April 18, 1989.

11. Telecon Note: Conversation between Ms. Sharon Sterople, Kearny Water Department, and Edmund Knyfd Jr., NUS Corp., April 18, 1989.

12. State of New Jersey Department of Environmental Protection, Division of Water Resources, Surface Water Quality Standards, N.J.A.C. 7: 9-4, Index D - Surface Water Classification of the Passaic, Hackensack and NY. Harbor Complex Basin, July 1985.

13. New Jersey Department of Environmental Protection, Division of Water Resources, Surface Water Quality Standards, N.J.A.C. 7:9-4.1 et. seq., May 1985.

14. Atlas of National Wetlands Inventory Maps for New Jersey, United States Department of the Interior, Fish and Wildlife Service, Region Five, Habitat Resources, 1984.

15. Atlantic Coast Ecological Inventory, United States Department of the Interior, U.S. Fish and Wildlife Service, 1980.

REFERENCES (CONT'D)

16. State of New Jersey Department of Environmental Protection, Water Supply Overlay, Sheet 26, August 1975.

17. General Sciences Corporation, Graphical Exposure Modeling Systems (GEMS). Landover, Maryland, 1986.

18. Off-Site Reconnaissance Information Reporting Form,NUS Corp. Region 2 FIT, April 20, 1989, TDD No. 02-8904-06.

19. Telecon Note: Conversation between Mr. Joseph Beckmeyer, Chief Engineer, Jersey City Sewage Authority, and Edmund Knyfd Jr., NUS Corp., April 26, 1989.

20. Telecon Note: Conversation between Mr. David Beeman, New Jersey Department of Environmental Protection, Waste Management Metro Field Office, and Edmund Knyfd Jr., NUS Corp., April 27, 1989.

21. Telecon Note: Conversation between Mr. Tom McKee, New Jersey Department of Environmental Protection, and Edmund Knyfd Jr., NUS Corp., April 27, 1989.

22. State of New Jersey Department of Environmental Protection, Hudson County Chromium Sampling Project, Presampling Assessment, Site Specific Information, 379-383 Eighth Street, Jersey City, New Jersey, December 22, 1987.

23. Report of air sampling activities performed at Modern Village Development Corporation Property. Aguilar Associates and Consultants, Inc., 1987.

24. Bragin, A.B., Hackensack River Symposium II, Fishes of the Lower Hackensack River, September 13, 1988, Fairleigh Dickinson University, Teaneck, New Jersey.

25. Telecon Note: Conversation between Mr. Bob Lorfink, Principal Engineer, Jersey City Water Engineering Department, and Edmund Knyfd Jr., NUS Corp., May 18, 1989.

26. New York State Department of Environmental Conservation, Water Quality Regulations, Surface Water and Groundwater Classifications and Standards, New York State Codes, Rules and Regulations, Title 6, Chapter X, Parts 700-705, October 31, 1985.

27. Department of Conservation and Economic Development, Division of Water Policy and Supply, Well Record, Permit No. 26-581, December 16, 1952.

28. Appraisal of Water Resources in the Hackensack River Basin, New Jersey. U.S. Geological Survey Water-Resources Investigations 76-74, June 1976.

REFERENCE NO. 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

RECEIVED
MAR 15 1989
S & M BRANCH

DATE: MAR 13 1989

SUBJECT: Preliminary Assessment Request

FROM: Dennis Santella, Chief Dennis Santella
Technical & Pre-Remedial Support Section

TO: Amy Brochu, FIT-RPO
Superfund Support Section

We received the enclosed letter regarding a potential hazardous waste site located in Jersey City, New Jersey. This site is a vacant lot where uncontrolled dumping of hazardous waste allegedly occurred. Residents in the area also have reason to believe that the waste may contain chromium. However, as per Howard Orlean of the EPA and Tom McKee of the NJDEP, this site is not part of the chromium waste site study in New Jersey.

The site will be entered into CERCLIS with the following name and address:

Eighth Street Site
Eighth Street
(between Division and Brunswick Streets)
Jersey City, New Jersey 07302

I am requesting that a Preliminary Assessment be performed at this site. Please note that this action is being taken as a result of a citizen request and that, as with all PAs, the assessment should be conducted within 1 year of entry into CERCLIS (by mid-March 1990).

Enclosure

cc: D. Santella, TPS
J. Harney, TPS
J. Gaal, TPS

3/16/89 Ron -
Please plan on conducting this PA within the next year.
Thanks -
Amy

REGION II FORM 1320-1 (9/85)

The redacted information consists of names, home addresses and/or phone numbers of private individuals. Disclosure of this information would constitute a clearly unwarranted invasion of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. § 552(b)(6).

Muszynski
Marshall
cc:/Lufting/Action
Randol
Response Due
3/8/89
Direct Reply

[redacted]
January 25, 1989

Regional Administrator
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Dear Administrator:

This Letter is to request that a preliminary assessment be conducted under the Comprehensive Environmental Response, Compensation and Liability Act. (CERLA) at a site near my residence.

The site is located in Jersey City, Hudson County, New Jersey on Eighth Street between Division and Brunswick Streets (see attached map). The site is a vacant lot where sporadic dumping has occurred over the last few years. The wastes are deposited in piles that appear to be composed of soil and construction debris. I believe that the deposition of these wastes are uncontrolled. I do not know of any permits for the site and the property is unattended. The local paper has indicated that these wastes may contain chromium since a large number of such sites have been discovered in Jersey City.

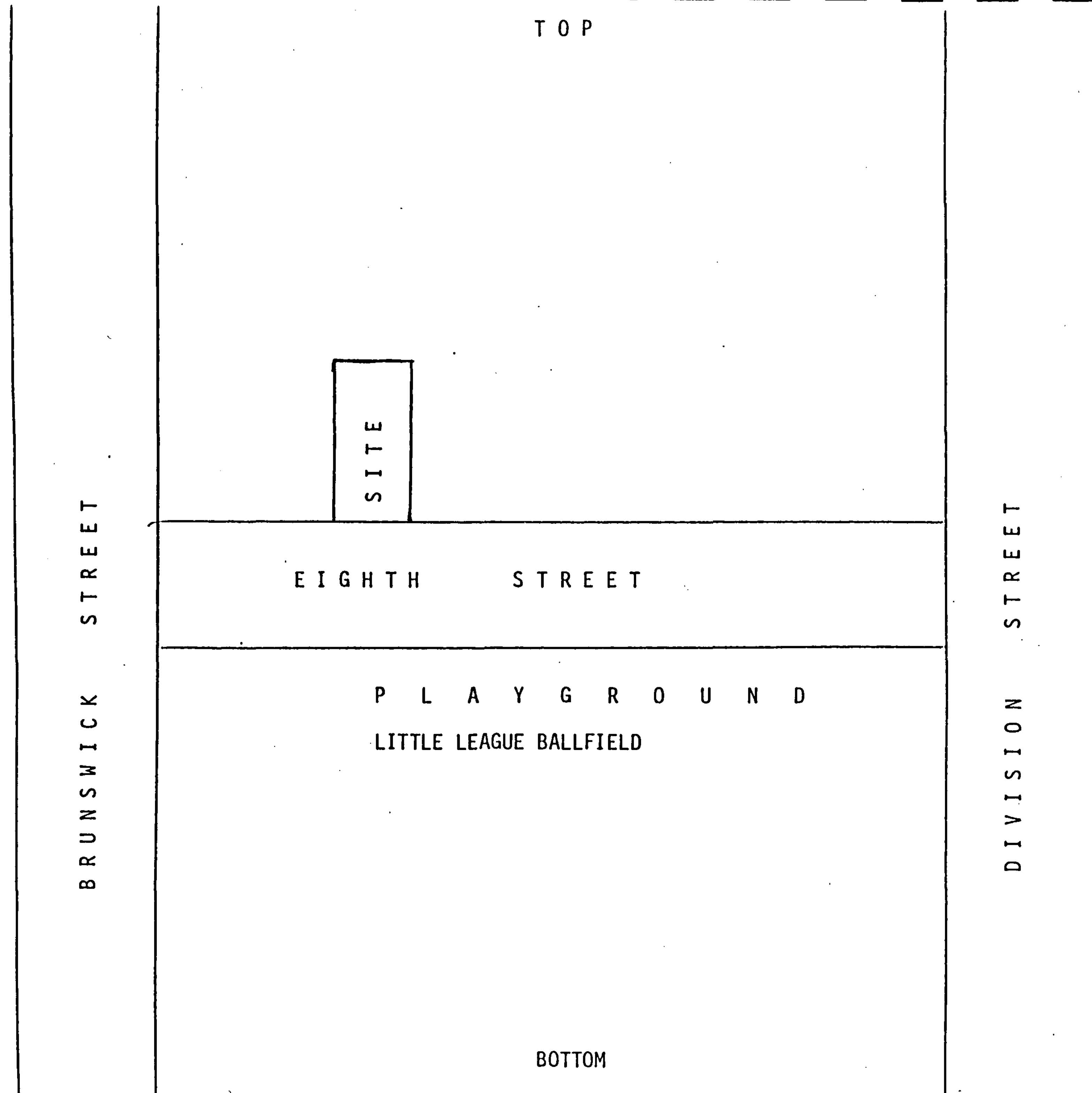
My neighbors and I have become concerned that dust from this site may be blowing into our residences and the yards where our children play. There is also a Little League Baseball Field and a playground across the street from the site.

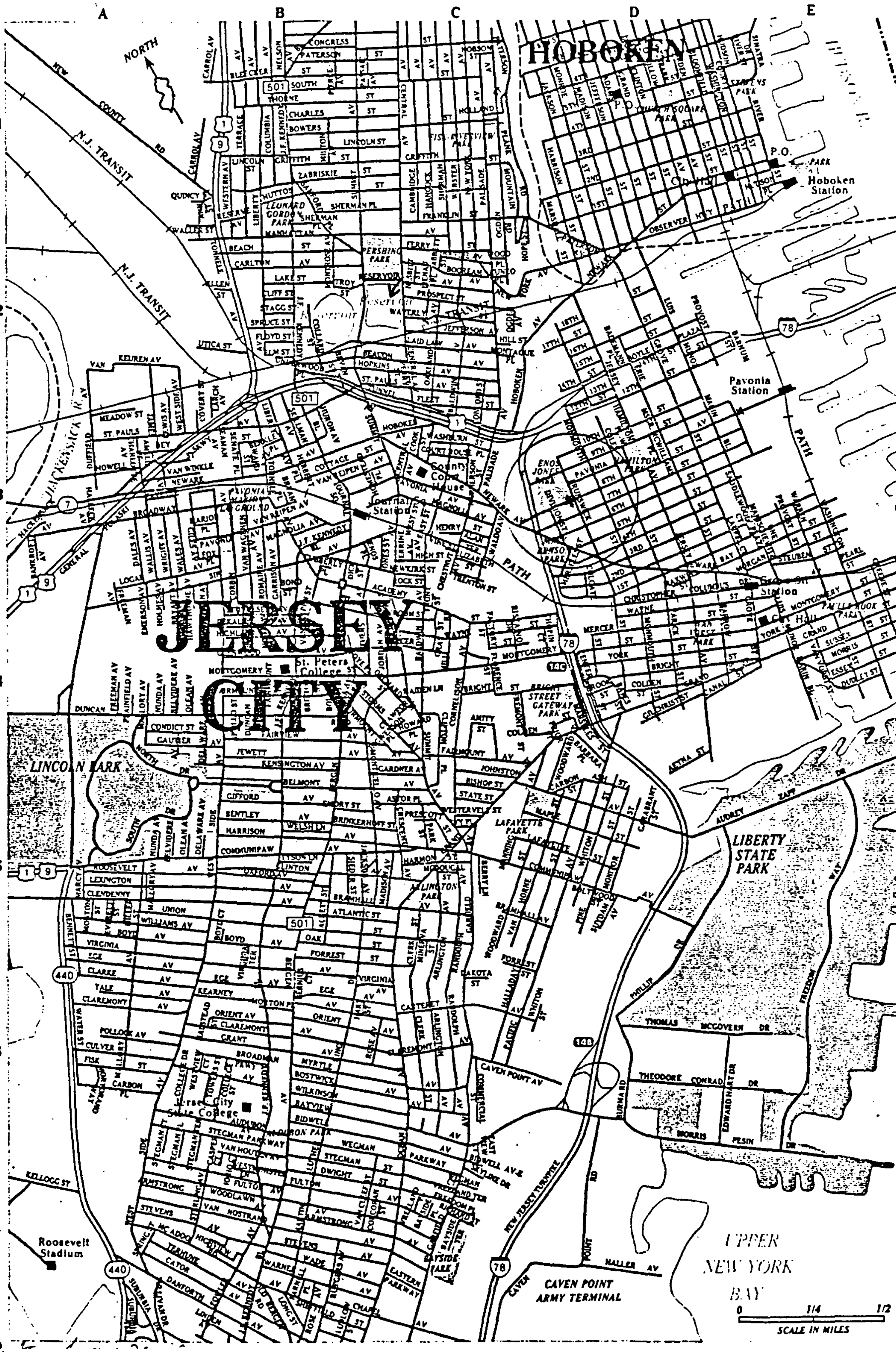
I would appreciate a prompt response to our petition as I am concerned about possible health effects from this site.

Thank you for considering my petition. If you have any questions, please call. I can be reached at [redacted].

Very truly yours,

[redacted]


TOP
SITE
BRUNSWICK STREET
EIGHTH STREET
DIVISION STREET
PLAYGROUND
LITTLE LEAGUE BALLFIELD
BOTTOM



A
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NORTH
HOBOKEN
JERSEY CITY
Hoboken Station
Pavonia Station
Journal Sq. Station
County Court House
St. Peters College
LINCOLN PARK
LIBERTY STATE PARK
Jersey City State College
Roosevelt Stadium
CAVEN POINT ARMY TERMINAL
UPPER NEW YORK BAY
N.J. TRANSIT
NEW COUNTY RD
PATH
NEW JERSEY TURNPIKE
PERSHING PARK
LEONARD GORDON PARK
CHURCH SQUARE PARK
HAMILTON PARK
VAN VORST PARK
LAFAYETTE PARK
BRIGHT STREET GATEWAY PARK
BAYSIDE PARK
THOMAS McGOVERN DR
THEODORE CONRAD DR
MORRIS PESIN DR
0
1/4
1/2
SCALE IN MILES

REFERENCE NO. 2

NUS CORPORATION

TELECON NOTE

CONTROL NO:	DATE:	TIME:
0Z-8904-06	4-11-89	1130

DISTRIBUTION:

TO FILE - EIGHTH STREET FILE

The redacted information consists of names, home addresses and/or phone numbers of private individuals. Disclosure of this information would constitute a clearly unwarranted invasion of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. § 552(b)(6).

BETWEEN:	OF:	PHONE:
[redacted]	AUTHOR OF PETITION PA	[redacted]

AND: ED KNYFD (NUS)

DISCUSSION:

[redacted] called to say that she talked with a neighbor of hers who said about a year ago, 4-11-88, the state attorney general's office was interviewing neighbors to see if they have noticed anyone dumping on the Eighth Street Site. People from the state attorney general's office had told the neighbors that the Eighth Street Site is definitely a chromium contaminated site. [redacted]'s neighbor is [redacted] [redacted], phone # [redacted]. [redacted] and her neighbors have noticed "men in white suites" on the Eighth Street Site; and indicated that at one time the EK ~~#~~ debris on site was covered with plastic, but the debris is no longer covered.

Elmmul Knyfd. 4-11-89

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE NO. 3

NUS CORPORATION TELECON NOTE

CONTROL NO: 02-8904-06	DATE: 4-11-89	TIME: 1050

DISTRIBUTION: TO FILE - EIGHTH STREET SITE

BETWEEN: BOB LORFINK	OF: PRINCIPAL ENGINEER FOR WATER ENGINEERING DEPT.	PHONE: (201) 547-4390

AND: ED KNYFD (NUS)

DISCUSSION:

Mr. Lorfink stated that drinking water for Jersey City is supplied by Boonton Reservoir and that 100% of their drinking water supply is from surface water. He indicated that there are now public water wells in Jersey City, although he didn't know if there are any private wells in use for drinking. He also indicated that Jersey City has an in-city reservoir located just south of Troy Street between Summit Ave and Central Ave. This reservoir is an open-air reservoir that is used for an excess supply of drinking water; it is filled and drained each day as water ~~needs~~ EK needs dictate.

Elmund Knyfd Jr. 4-11-89

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE NO. 4

A GERAGHTY & MILLER SPECIAL REPORT

The New Jersey Ground-Water Situation

by David W. Miller

August, 1979 (see telecon note - 02-880332-~~$~~I ~~[illegible]~~ 5/12/88

GERAGHTY & MILLER, INC.
Groundwater
Consultants

HACKENSACK, NEW JERSEY
7 Atlantic Street
Hackensack, New Jersey 07601
(201) 646-1400

SYOSSET, NEW YORK
North Shore Atrium
6800 Jericho Turnpike
Syosset, New York 11791
(516) 921-6060

THE AQUIFER SYSTEMS

For a general discussion of ground-water conditions in New Jersey, the state can be divided into three broad geographic areas based on the distinctive rock types that occur in each (Figure 1). The Coastal Plain physiographic province is the largest area, and encompasses more than 5,000 square miles in the southern portion of the state. The geology of the Coastal Plain is characterized by a southeasterly dipping and thickening sequence of unconsolidated sediments.

The Triassic Lowlands are underlain by thousands of feet of red shale, with some sandstone, siltstone, conglomerate, basalt and diabase. The geologic formations in the Highlands region consist of hard crystalline rocks such as the Precambrian gneisses and quartzites; carbonates, such as the Kittatinny limestone; and relatively dense sandstones, conglomerates and shales, such as the Martinsburg.

Bedrock in both the Triassic Lowlands and the Highlands is overlain by unconsolidated deposits of glacial origin. In places, these surficial deposits are thick and permeable, and are commonly in direct hydraulic connection with the underlying bedrock and adjacent streams, rivers, and lakes.

THE TRIASSIC LOWLANDS AND THE HIGHLANDS REGION OF NORTHERN NEW JERSEY

The geology and hydrology of northern New Jersey are considerably more complex than the Coastal Plain region. To simplify, it has been divided into two broad areas, the Triassic Lowlands and the Highlands Region (Figure 1). Unlike the Coastal Plain, where the aquifers consist of extensive beds of unconsolidated deposits, the primary water-bearing units in northern New Jersey are sedimentary and crystalline rocks (Figure 11). These vary considerably in their ability to yield water, depending on rock type and location. Both regions are also heavily dependent upon unconsolidated glacial deposits for water supply and where these occur in buried, eroded rock channels and are thick and permeable, the glacial sediments represent the most important source of ground water in both the Triassic Lowlands and the Highlands. Figure 12 shows the general major deposits of glacial origin that may have some ground-water potential.

Geology and Hydrology

Triassic Sediments: The Triassic Lowlands are almost entirely underlain by sedimentary Brunswick Shale. Although its primary permeability is low, appreciable amounts of water are found in joints and fractures. However, unless a significant number of these joints and fractures are penetrated by a well, yields can be relatively small. The direction of highest permeability and of the greatest movement of water in response to pumping tends to parallel the strike of the beds, generally southwest to northeast.

In general, the principal water-bearing zone of the Triassic rocks ranges from less than 200 feet to 600 feet in depth. The median depth of industrial and municipal supply wells in Bergen County is 260 feet. High-yield wells tapping this aquifer in Essex County are between 300 and 400 feet deep. There appears to be a direct relationship between well yield and thickness of overlying unconsolidated glacial deposits. Wells generally produce more where the overlying deposits are relatively thick, stratified, and coarse-grained. These surface deposits are often in direct hydraulic connection with the bedrock, and act as a source of recharge because of their greater capacity to receive and store precipitation (Figure 12).

A number of high capacity wells tap the Triassic rocks. In Essex County, yields of 35 public supply, industrial, and commercial wells range from 35 to 820 gpm (gallons per minute) and average 364 gpm. Wells over 300 feet deep and larger than 8 inches in diameter have a median yield of 230 gpm in Passaic County. However, the ability to develop high capacity wells is not uniform throughout the region. Many wells drilled during exploration programs are never equipped as production wells because of poor yields.

Igneous rocks associated with the sedimentary formations, principally diabase and basalts, are highly resistant to erosion and form the ridges of the Watchung Mountains and the Palisades. They are poor aquifers, tapped primarily for domestic purposes by wells yielding 5 gpm or less.

Precambrian Rocks and Paleozoic Sediments: The Highlands Region is underlain by dense bedrock of limited ground-water potential. Rocks in the area immediately adjacent to the Triassic Lowlands, and situated in a northeast-southwest band through the central portion of northern New Jersey, consist chiefly of Precambrian gneisses (Figure 11). These crystalline rock formations contain ground water in joints and fractures of limited extent and storage capability. Well yields are relatively small, seldom over 150 gpm. In Sussex County, 45 percent of the domestic wells tapping the Precambrian gneiss yield 5 gpm or less.

Several very dense limestone formations containing solution cavities are associated with the Precambrian gneisses. In rare instances where these cavities have been penetrated by wells, yields can exceed several hundred gpm. In most cases, ground water is contained in joints and fractures which typically yield 15 gpm or less to wells.

The northwestern portion of the state is characterized by a parallel series of valleys and ridges composed of Paleozoic age sedimentary rocks (Figure 11). The ridges are resistant limestones, sandstones, and conglomerates. The valleys are underlain by softer shales, siltstones, calcareous shales, and limestones. Although these rocks are not good aquifers, they are an important source of water for domestic wells. The only exception is the Kittatinny Limestone, which underlies portions of Sussex, Warren, and Hunterdon Counties. In Hunterdon County, industrial wells tapping this formation and penetrating solution cavities typically yield 400 gpm; a few produce as much as 1,500 gpm.

Glacial Sediments: Unconsolidated deposits overlying rock in northern New Jersey consist generally of till, clay, or stratified drift. These deposits are thickest in the valleys and thin or absent in upland areas. Permeable sands and gravels contained within the valley fill sediments that are suitable for ground-water development range in thickness from 50 to several hundred feet. Individual beds that can support high capacity wells are not extensive, and lithology may change radically over as little as 100 feet within the same valley. Well yields commonly reported for the glacial sediments represent successful wells located from a program of test drilling and pumping.

Although the rock aquifers have been mapped in some detail throughout both the Triassic Lowlands and the Highlands Region, the areal extent of important glacial aquifers is relatively unknown except in some of the more heavily developed areas of eastern Morris and western Essex Counties, Union County, the Ramapo River subbasin, and the Rockaway River subbasin (Figure 12).

Public supply and industrial wells tapping the more permeable stratified drift are almost uniformly capable of producing several hundred thousand gpd to more than one mgd. For example, yields of wells completed in Union County in 50 to 200 feet of sand and gravel sediments in Kenilworth-Newark Valley, Summit Valley, Union Valley, and Rahway Valley, average approximately 400 gpm. Wells in Essex and Morris Counties tapping glacial sands and gravels adjacent to the Passaic River and its tributaries produce one to 1.5 mgd. Total pumpage from the system of buried valleys in this latter area is about 20 mgd, with the highest yields from formations receiving recharge from adjacent streams.

Relationship Between Ground and Surface Water

Little effort has been devoted to establishing the relationship between ground-water withdrawals and streamflow in northern New Jersey. Many planners and regulatory personnel consider surface water and ground water as different resources. In fact, diversions have been awarded individually for either surface-water rights or ground-water rights in the same basin. The impacts of the aggregate diversion of the two interrelated resources are rarely investigated in detail.

Studies of the Ramapo River subbasin indicate that the Ramapo River is a losing stream during part of the year over a portion of its reach; at times it is a losing stream for its entire length from the state line to Pompton Lake. Generally, this seepage loss extends further downstream as the summer season continues. Much of the loss is attributable to ground-water pumpage along the Ramapo channel, substantiating the ability of ground-water pumpage within the basin to reduce river flow and at times actually cause river water to recharge the aquifer.

The Rockaway River subbasin, like the Ramapo, is an area where ground-water pumpage from the stratified drift along the river has an effect on streamflow during dry periods. Jersey City diverts water for public supply from the Boonton Reservoir on the Rockaway River downstream of these ground-water diversions, and a planned expansion of the area's sewage treatment plant will increase the consumptive use of ground water by 2020. Domestic sewage previously discharged back into the ground-water system via cesspools and septic tanks will be discharged downstream of the reservoir, and will reduce ground-water recharge and streamflow.

There are several other locations where ground-water pumpage may be contributing to low streamflow. In the Whippany, Upper Passaic, and Lower Passaic River subbasins, the volume of reported public supply and industrial ground-water pumpage, together with grandfather rights pumpage, significantly affect the streams during low flow periods. The problem also is aggravated by the diversion of potential recharge out of the area through sewer systems. Surface-water resources in these basins are extensively developed for supply and receive and dilute waste water.

Other factors also distort the natural water balance between streams and aquifers. Intensive urbanization, e.g., widespread paving of aquifer recharge areas and construction of storm drains, reduces ground-water recharge and makes less water available to streams between periods of rainfall. The interrelationship of all factors must be considered in order to manage ground-water withdrawals where they are likely to impact surface-water resources.

Ground-Water Availability

The recharge of ground-water systems by precipitation in northern New Jersey is highly variable, and depends on factors such as the nature of surficial deposits, topography, rock lithology, and structural features. The storage capacity of rocks of the Triassic Lowlands, as well as most of the Precambrian and Paleozoic age rocks of the Highlands Region is low and unevenly distributed: these rocks can be dewatered much more easily than the Coastal Plain sands. This is especially true if the water level in the rocks drops below the fractures which serve as major water producing zones.

Under pumping conditions some of the rock aquifers in northern New Jersey exhibit directional hydraulic behavior. At a given distance from a pumping well, water-level drawdowns are usually greater parallel to the strike, or bedding, of the rocks, than perpendicular to it. These factors make the prediction of maximum yields in the northern part of the state more difficult; detailed site-specific data are necessary in most areas.

Natural recharge rates to valley fill sediments may be as high as one mgd per square mile and additional recharge may be induced from an adjacent stream. Since many streams in northern New Jersey are utilized for community supply, and much of their flow is already committed to present or future river intake systems and impoundments, management decisions regarding greatly increased pumpage from alluvial deposits must be made with great care on an individual case-by-case basis.

Although the glacial deposits represent a major aquifer system and can generally yield larger quantities of water than rock aquifers, they are relatively thin and limited in extent. Thus, where recharge from surface-water bodies is not sufficient to meet the demands of local heavy pumpage, dewatering of these aquifers can take place, resulting in lowered water levels and declining yields.

Ground-water availability and problems resulting from excessive withdrawals are usually discussed in terms of an aquifer's "safe yield". Studies done for various counties have attempted to estimate this value for each county. However, from a planning viewpoint, safe yield should be considered as the greatest amount of ground water that can be used consumptively over a long term without causing undesirable effects. Depending on the area, these effects may include reducing streamflow, lowering lake levels, and dewatering shallow wells as a result of a falling water table.

Most reports equate safe yield with the pumpage which will approach, but not exceed, the average recharge rate for the study area. While maintaining the amount of pumpage below the average recharge rate will not cause ground-water mining (loss of ground water from storage for an indefinite period), it can result in a temporary loss of storage and in water-level declines until a new equilibrium elevation is reached. Actually, maximum potential yield depends on a wide range of prevailing hydrologic and environmental relationships in a particular area.

Another complicating factor in the intelligent management of the resource is consumptive use of ground water, i.e., where water is not returned to the ground-water system from which it was removed. On-lot septic systems and wells which recharge industrial process or cooling waters return water to the ground and do not represent consumptive uses. Wastewater discharges to sewers, which in turn discharge to surface waters, are assumed to be consumptive, and are an important factor in reducing ground-water availability, especially in northeastern New Jersey (Figure 13).

Finally. land-use planning in the heavily urbanized northeast portion of the Triassic Lowlands has generally failed to consider the adverse effects of paving potential recharge areas. and/or the impact of construction of regional sewers on ground-water availability. In addition, many communities wholly dependent on ground water are so built up that there is not enough remaining open space to carry out the exploration necessary to locate additional production well sites.

In the preparation of this special report, factors affecting ground-water availability such as recharge rates, pumpage, diversion rights, consumptive use, and interference with surface-water supplies were evaluated on a county-by-county basis. This information was supported by interviews with ground-water users and public agency personnel, and review of data from organizations involved in water-resource management (state, USGS, interstate agencies, and private consultants). Table 2 summarizes ground-water pumpage in northern New Jersey.

Bergen County: Generally, the eastern section of the county is supplied by surface water and the western section by ground water. Portions of the central and southwestern sections are served by both.

Because yields are generally higher, about 75 percent of the pumpage in the Ramapo River basin is from stratified drift, even though it underlies only a small percentage of the total basin area. Wells in valley-fill deposits supply most of Mahwah and all of Oakland.

Industrial and public supply pumpage is concentrated in a central north-south band, east of the Passaic River, and near the Saddle River. Most of the southern and central part of the county is sewered: only public supply pumpage in the extreme northern section of the county is not used consumptively. The percentage of industrial pumpage used consumptively is unknown, but many of the industrial plants along the Passaic and Saddle Rivers discharge to the rivers, and the water is essentially lost from the ground-water system. There are indications of areawide water-level declines in southern Bergen County from overpumping the Triassic shales.

The opportunity for further development of ground water depends to a great degree on the future industrial pumpage, and the ability to develop surface water and ground water conjunctively in basins containing significant glacial deposits. The bedrock aquifer already appears to be overstressed in areas of concentrated pumpage.

* Essex County: Ground water accounts for about 28 percent of the total water used in the county. More than 80 percent of the 35 mgd pumped for public supply is obtained from stratified drift deposits, mostly in the western portion of the county. This heavy pumpage and urbanization in the Livingston-Florham Park-Millburn area have resulted in severe water-level declines in both the unconsolidated and sandstone aquifers, which function as a single hydraulic unit in the area (Figure 12).

* Heavy pumpage from the Triassic sediments in the Newark area has exceeded the average recharge to the system, and water levels have been declining for years with serious salt-water intrusion from Newark Bay and the Passaic River. Newark and the western valley-fill aquifer areas are of

special concern. and severe water-level declines will continue unless effective water management plans are implemented.

Hudson County: Water quality is a major constraint on ground-water development in Hudson County. Ground-water quality in the unconsolidated deposits in the Hackensack Meadows is greatly influenced by the poor quality of the Hackensack River. and by tidal flooding of the meadows. Heavy pumping at Hackensack and near North Bergen has induced poor quality water from the Hackensack River into the sand and gravel aquifers. High chloride water in the lower Hackensack River is unsuitable for most municipal and industrial processes except cooling.

Hunterdon County: Northwestern portions of Hunterdon County rely heavily on surface water from the Musconetcong and Delaware Rivers, while ground water supplies most of the remaining area. About 25 percent of all the public utilities obtain their supplies from surface-water bodies, 40 percent rely on ground water, and the remainder use a combination of both.

Public supply and industrial pumpage is distributed unevenly throughout Hunterdon County. The greatest local consumption occurs in the southeastern portion, principally from rock aquifers. Glacial drift deposits along the Delaware River have supplied about 10 percent of Hunterdon's groundwater demands, and could supply considerably more in the future.

Mercer County: Approximately 30 mgd of Mercer County's total usage is surface water, derived principally from the Delaware River drainage basin in the western half of the county which includes about 80 percent of its

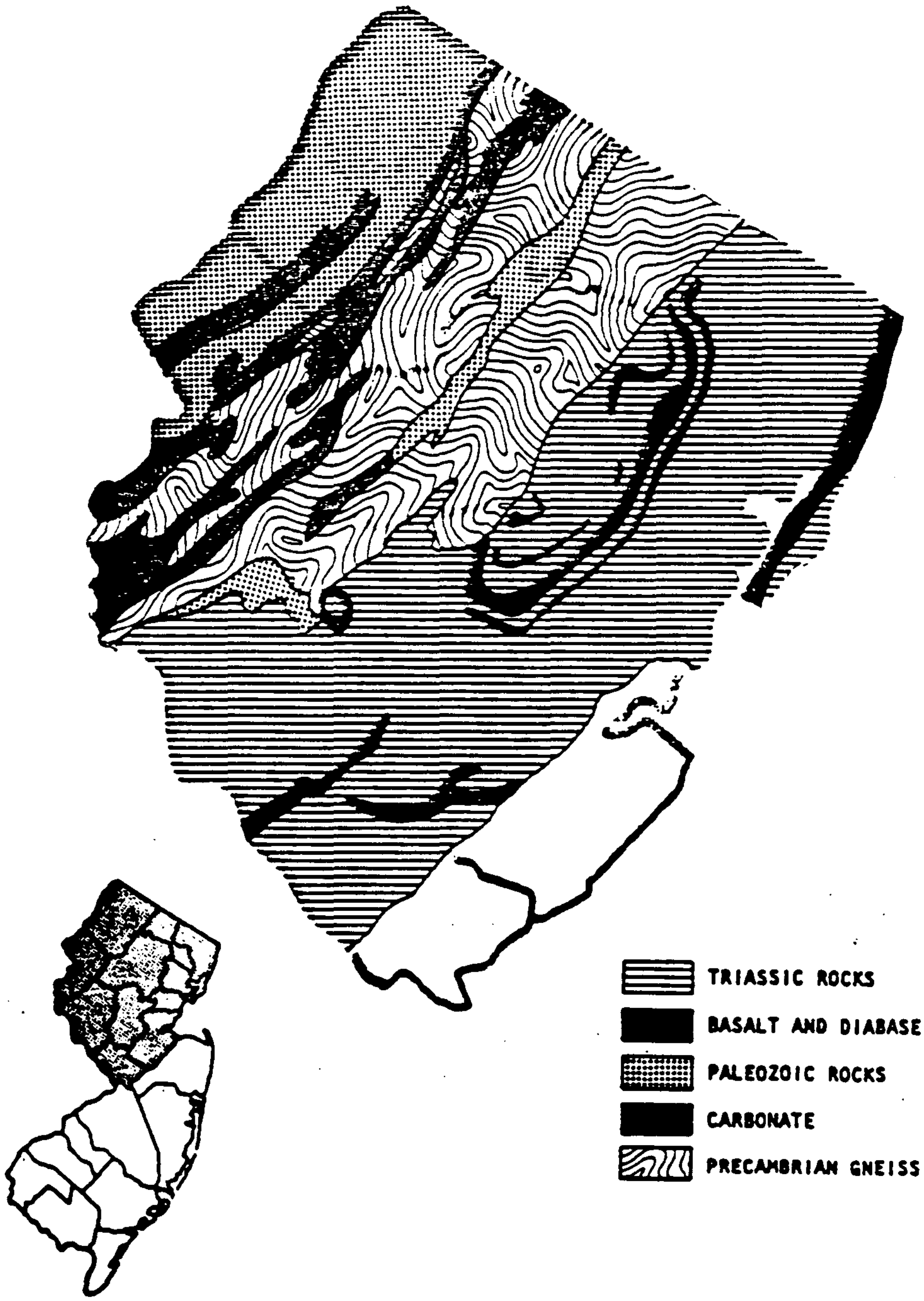


Figure 11 - BEDROCK GEOLOGY IN NORTHERN NEW JERSEY

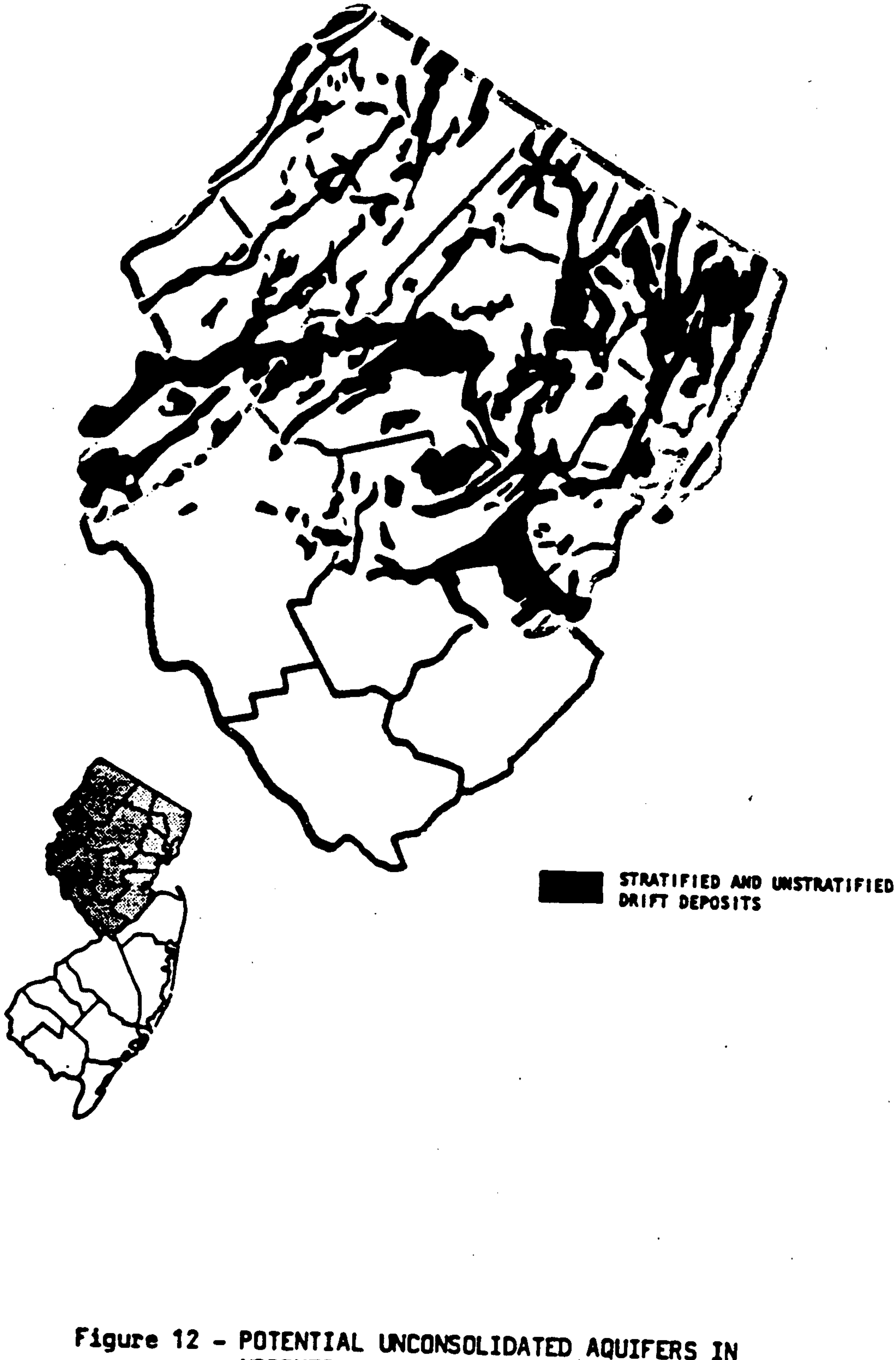


Figure 12 - POTENTIAL UNCONSOLIDATED AQUIFERS IN NORTHERN NEW JERSEY

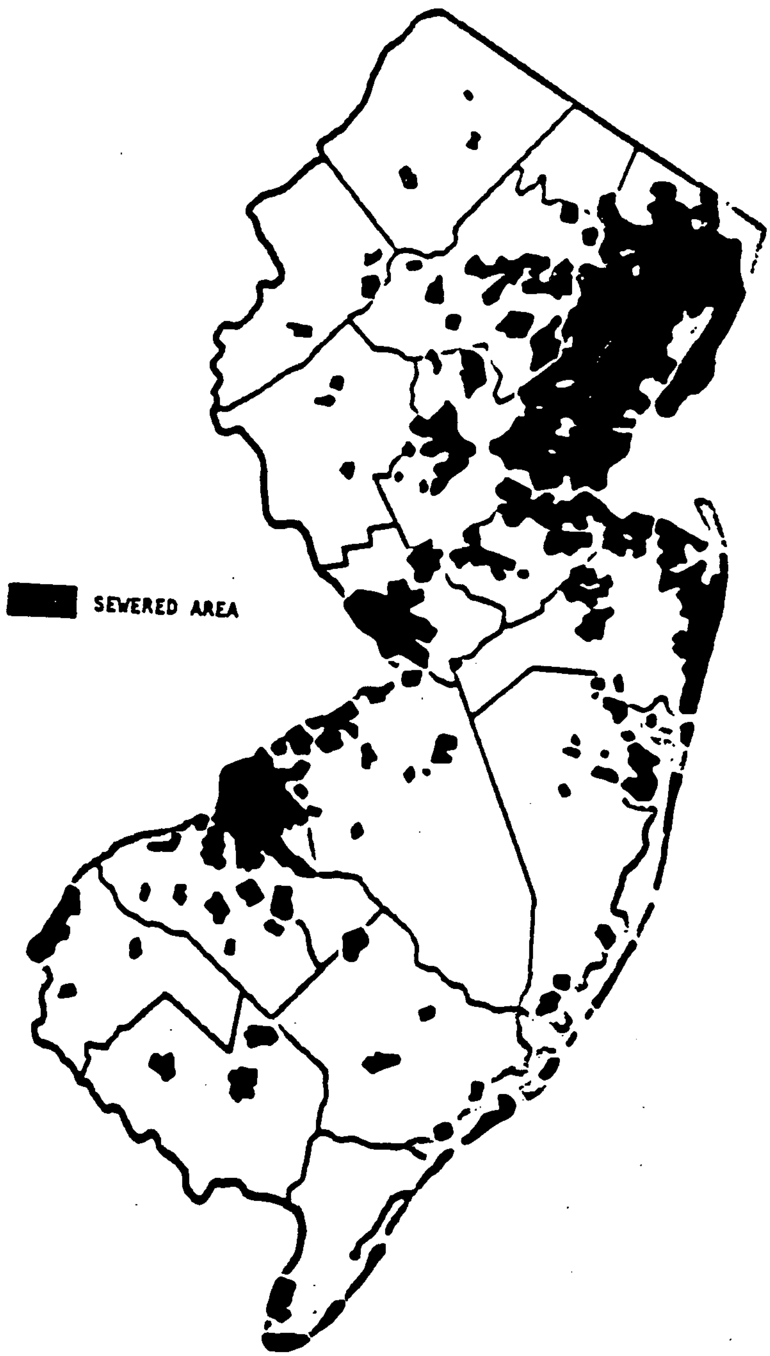


Figure 13 - EXTENT OF SEWERED AND UNSEWERED AREAS

REFERENCE NO. 5

NUS CORPORATION TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8904-06	5-15-89	1125

DISTRIBUTION: TO FILE, EIGHTH STREET SITE

BETWEEN:	OF:	PHONE:
DREW BARIS	EPA REGION 2 - OFFICE OF GROUNDWATER MGMT.	(212) 264-5635

AND: EDMUND KNYFD JR. (NUS)

DISCUSSION:

I asked Drew if there EK is ~~was~~ a current or pending sole source aquifer designation for Jersey City. He said there EK ~~was~~ is no current or pending sole source aquifer designation for Jersey City; and most likely there will not be one because Jersey City gets their water supplies from reservoirs.

Edmund Knyfd Jr. 5-15-89

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE NO. 6

NUS CORPORATION

TITLE: THREE MILE VICINITY MAP

SITE: EIGHTH STREET SITE JERSEY CITY, N.J.

DATE: 04/17/89

TDD: 02-8904-06

QUAD: JERSEY CITY, N.J.

FIGURE NUMBER:

SCALE: 1" = 2000'

REFERENCE NO. 7

Uncontrolled Hazardous Waste Site Ranking System

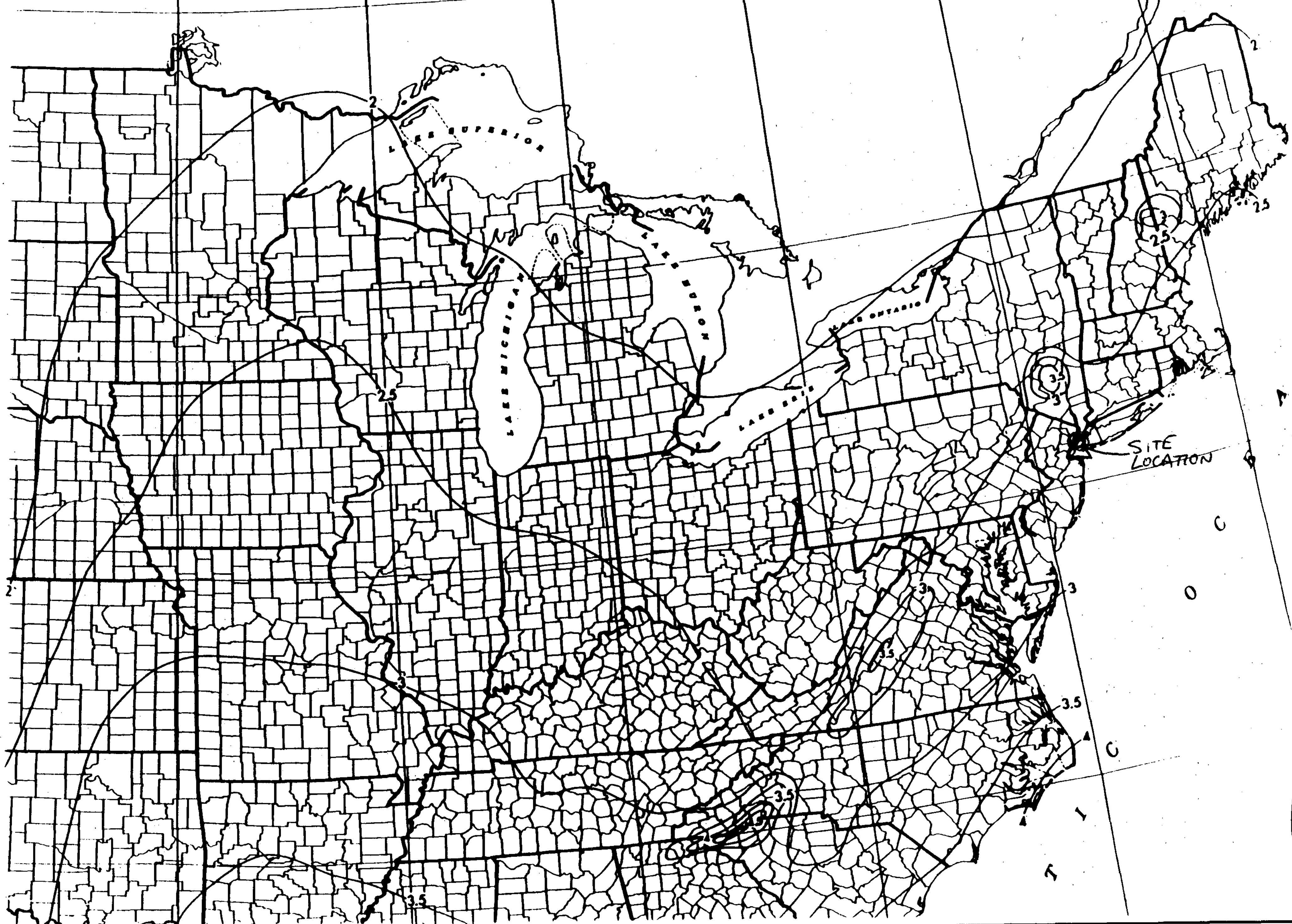
A Users Manual
(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

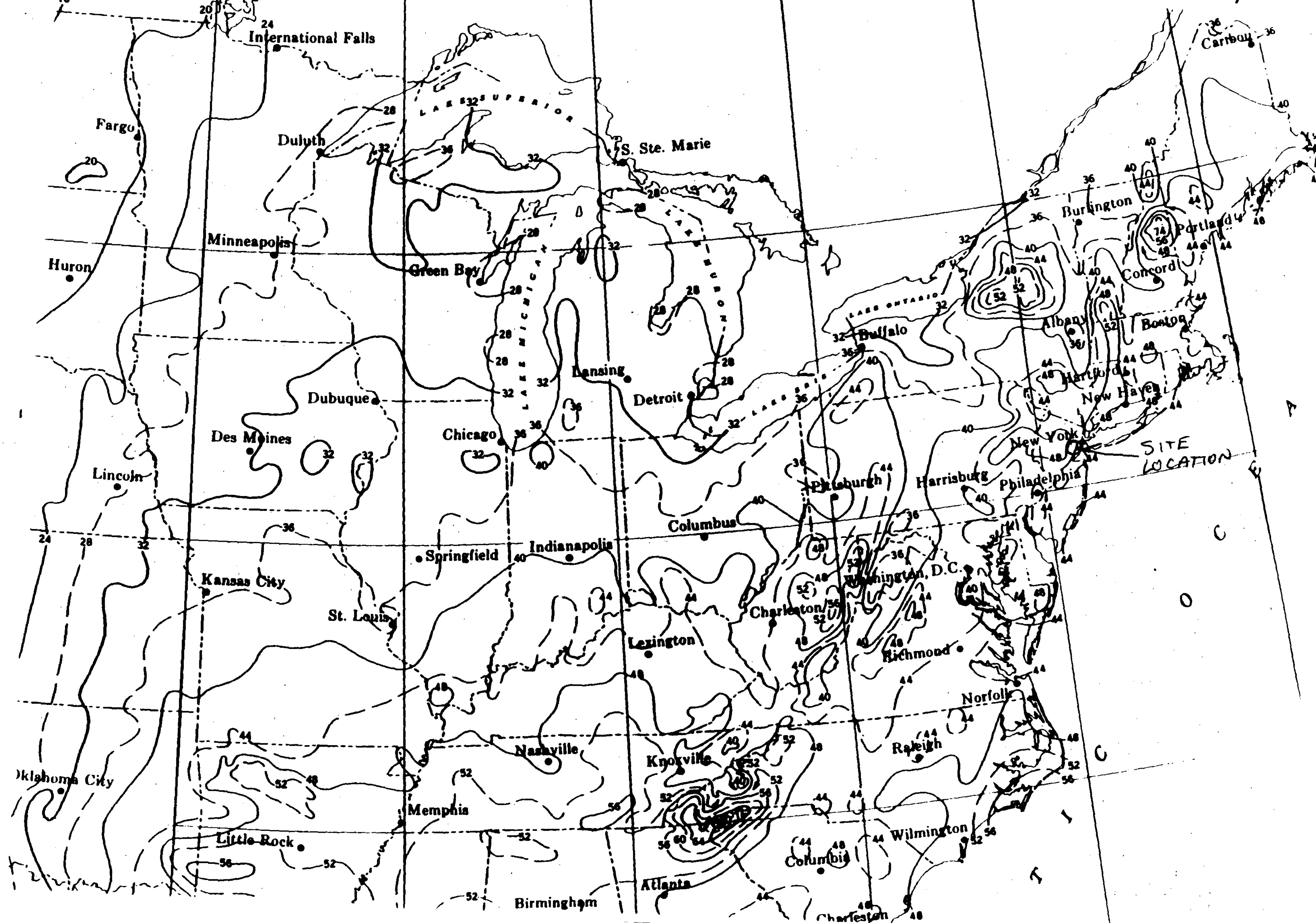
United States
Environmental Protection
Agency

1984

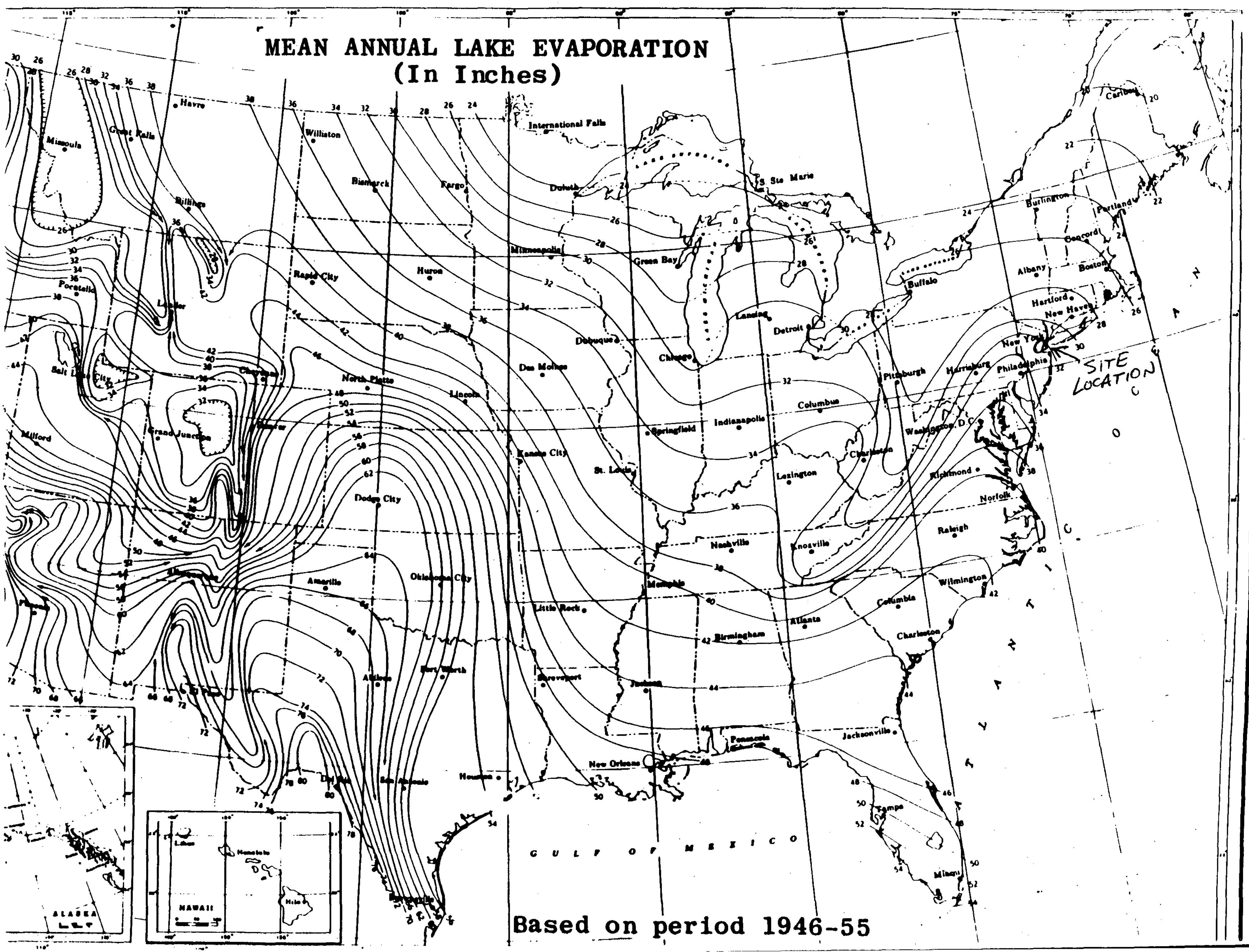
1 YEAR 24-HOUR RAINFALL (inches)



NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



MEAN ANNUAL LAKE EVAPORATION (In Inches)



Based on period 1946-55

TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

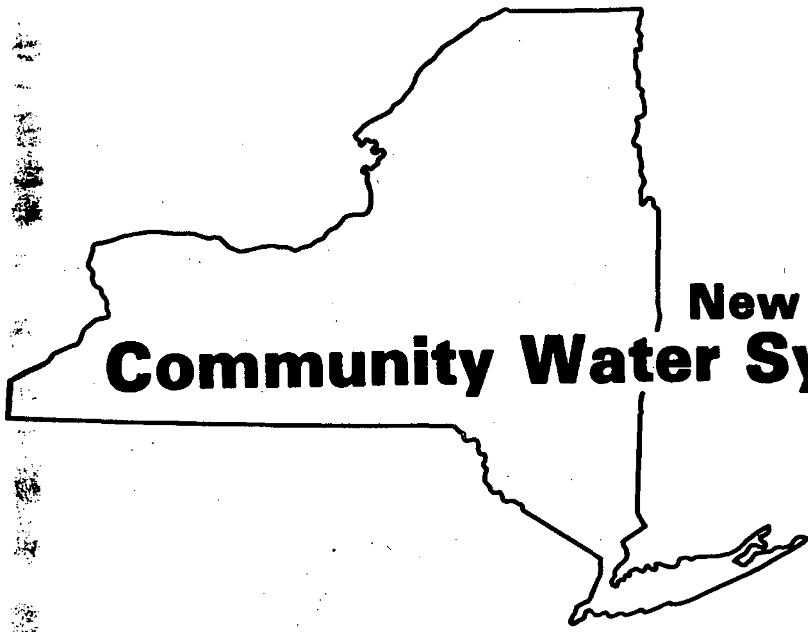
Type of Material	Approximate Range of Hydraulic Conductivity	Assigned Value
Clay, compact till, shale; unfractured metamorphic and igneous rocks	$<10^{-7}$ cm/sec	0
Silt, loess, silty clays, silty loams, clay loams; less permeable limestone, dolomites, and sandstone; moderately permeable till	10^{-5} - 10^{-7} cm/sec	1
Fine sand and silty sand; sandy loams; loamy sands; moderately permeable limestone, dolomites, and sandstone (no karst); moderately fractured igneous and metamorphic rocks, some coarse till	10^{-3} - 10^{-5} cm/sec	2
Gravel, sand; highly fractured igneous and metamorphic rocks; permeable basalt and lavas; karst limestone and dolomite	$>10^{-3}$ cm/sec	3

*Derived from:

Davis, S. N., Porosity and Permeability of Natural Materials in Flow-Through Porous Media, R.J.M. DeWest ed., Academic Press, New York, 1969

Freeze, R.A. and J.A. Cherry, Groundwater, Prentice-Hall, Inc., New York, 1979

REFERENCE NO. 8



New York State Atlas of
Community Water System Sources
1982

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF PUBLIC WATER SUPPLY PROTECTION

NASSAU COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
Municipal Community			
1	Albertson Water District	13500.	Wells
2	Bayville Village	7500.	Wells
3	Bethpage Water District	32000.	Wells
4	Bowling Green Water District	12000.	Wells
5	Carle Place Water District	11000.	Wells
6	Citizens Water Supply Company	30000.	Wells
7	Deforest Drive Association	25.	Wells
8	East Meadow Water District	52000.	Wells
9	Farmingdale Village	7946.	Wells
10	Franklin Square Water District	20000.	Wells
11	Freeport Village	38272.	Wells
12	Garden City Park Water District	22596.	Wells
13	Garden City Village	22927.	Wells
14	Glen Cove City	24618.	Wells
15	Hempstead Village	40404.	Wells
16	Hicksville Water District	58000	Wells
17	Jamaica Water Supply Company	128448.	Wells
18	Jericho Water District	64000.	Wells
19	Levittown Water District	50000.	Wells
20	Lido-Point Lookout Water District	10000.	Wells
21	Locust Valley Water District	8500.	Wells
22	Long Beach City	34073.	Wells
23	Long Island Water Corporation	258936.	Wells
24	Manhasset-Lakeville Water District	44730.	Wells
25	Massapequa Water District	52000.	Wells
26	Mill Neck Estates Water Supply	240.	Wells
27	Mineola Village	20600.	Wells
28	New York Water Service	172180.	Wells
29	Old Westbury Village	3100.	Wells
30	Oyster Bay Water District	10225.	Wells
31	Plainview Water District	40000.	Wells
32	Plandome Village	2616.	Wells
33	Port Washington Water District	35000.	Wells
34	Rockville Centre Village	25405.	Wells
35	Roosevelt Field Water District	1640.	Wells
36	Roslyn Water District	27500.	Wells
37	Sands Point Village	3002.	Wells
38	Sea Cliff Water Company	17850.	Wells
39	Sel-Bra Acres Water Supply	80.	Wells
40	South Farmingdale Water District	49900.	Wells
41	Split Rock Water Supply	25.	Wells
42	Uniondale Water District	25000.	Wells
43	West Hempstead-Hempstead Garden Water District	32000.	Wells
44	Westbury Water District	20050.	Wells
45	Williston Park Village	8216.	Wells
Non-Municipal Community			
46	Community Hospital at Glen Cove	1350.	Wells
47	Planting Fields Arboretum	90.	Wells
48	Stuart, Walker, Zimmer Water Supply	41.	Wells

NEW YORK CITY WATER SUPPLY

The majority of New York City residents receive their drinking water from the New York City Aqueduct System. Only a portion of the borough of Queens is supplied by a separate ground-water system, the Jamaica Water Supply.

The New York City Aqueduct System consists of the Croton, Delaware, and Catskill branches. It is supplied by reservoirs and lakes in Westchester, Putnam, Ulster, Schoharie, Delaware, and Sullivan Counties. The reservoirs and lakes supplying the respective aqueduct branches are designated in those counties.

CROTON SYSTEM - The Croton supply is the oldest system which has a safe yield of about 240 MGD*. The Croton System embodies 12 reservoirs and 4 controlled lakes, situated in Westchester and Putnam Counties, which impound about 95 billion gallons of water from 375 square miles of the Croton River drainage area. The principal structures in the present Croton System are the New Croton Dam and the New Croton Aqueduct which supplemented the Old Croton Aqueduct now out of service. Croton water is delivered via the New Croton Aqueduct to the Jerome Park Reservoir in the Bronx and then via aqueduct and conduits to the Central Park Reservoir in Manhattan. The delivery capacity of the Aqueduct from the New Croton Reservoir to the Jerome Park Reservoir is 275 MGD.

CATSKILL SYSTEM - The Catskill supply is the second major system which has a safe yield of about 470 MGD. Its principal structures are the Schoharie, Ashokan, Kensico, and Hill View Reservoirs.

The Ashokan Reservoir impounds 128 billion gallons of available storage, at Elevation 590 in the West Basin and at Elevation 587 in the East Basin, from 257 square miles of drainge area in the Catskill Mountains west of Kingston. The Ashokan Reservoir feeds directly into the Catskill Aqueduct.

The Schoharie Reservoir, placed in service in 1924, impounds 19.6 billion gallons of available storage, at Elevation 1130, from 314 square miles of drainage area.

The Catskill Aqueduct is 92 miles long overall, extending 75 miles from the Ashokan Reservoir to the upstream influent chamber of the Kensico Reservoir, with a 2-mile bypass, then continuing 15 miles from the Kensico Reservoir effluent chamber to the Hill View Distributing Reservoir in Yonkers.

The Kensico Reservoir was originally constructed as an equalizing basin on the Catskill Aqueduct. The reservoir, having a safe yield of 5 MGD from its own drainage area, is formed by the Kensico Dam.

DELAWARE SYSTEM - The Delaware supply is the latest system which has a safe yield of about 580 MGD. The supply from the Delaware watershed, which is stored in the Neversink, Pepacton, and Cannonsville Reservoirs, has a safe yield of about 480 MGD. The Rondout Reservoir, serving as a collecting reservoir for these three reservoirs, has a safe yield of about 100 MGD from its own drainage area of 95 square miles which is part of the Hudson watershed. This reservoir impounds 50 billion gallons of available storage at the flow line, Elevation 840.

The Delaware Aqueduct is a pressure tunnel deep in bed rock for its entire length of 85 miles.

JAMAICA WATER SUPPLY - The Jamaica-Queens Water Company serves the Jamaica section of the borough of Queens. This system utilizes 76 wells located in 46 separate well fields. A map depicting the Jamaica-Queens service area is included on Page 77.

* Millions of Gallons per Day

REFERENCE NO. 9

Official State Estimates

Population Estimates for New Jersey

JULY 1, 1982

OFFICE OF DEMOGRAPHIC AND ECONOMIC ANALYSIS
DIVISION OF PLANNING AND RESEARCH
DEPARTMENT OF LABOR
C N 388
TRENTON, NEW JERSEY 08625-0388

THOMAS H. KEAN
Governor

ROGER A. BODMAN

SEPTEMBER 1983

RESIDENT POPULATION

HUDSON COUNTY	CENSUS COUNTS, APRIL 1, 1980	REVISED ESTIMATES, JULY 1, 1981	PROVISIONAL ESTIMATES, JULY 1, 1982
Bayonne city	65,047	64,891	64,283
East Newark borough	1,923	1,915	1,896
Guttenberg town	7,340	7,413	7,339
Harrison town	12,242	12,292	12,254
Hoboken city	42,460	42,395	42,104
Jersey City city	223,532	222,405	221,937
Kearny town	35,735	35,612	35,255
North Bergen township	47,019	47,485	47,073
Secaucus town	13,719	14,634	15,017
Union City city	55,593	57,436	56,709
Weehawken township	13,168	13,471	13,335
West New York town	39,194	42,214	41,798
TOTAL	556,972	562,163	559,000

REFERENCE NO. 10

NUS CORPORATION TELECON NOTE

CONTROL NO: 02-8904-06-PA	DATE: 4-18-89	TIME: 0935

DISTRIBUTION:

TO FILE - EIGHTH STREET SITE

BETWEEN: JOE LOCITO	OF: HOBOKEN WATER DEPARTMENT	PHONE: (201) 420-2078

AND:

EDMUND KNYFD JR. (NUS)

DISCUSSION:

I asked Joe where Hoboken gets their public supply drinking water from; he indicated that their water comes from the Boonton Reservoir via the Jersey City Water Department.

Edmund Knyfd Jr. 4-18-89

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE NO. 11

NUS CORPORATION TELECON NOTE

CONTROL NO: 02-8904-06	DATE: 4-18-89	TIME: 0955

DISTRIBUTION:

TO FILE - EIGHTH STREET SITE

BETWEEN: SHARON STEROPLE	OF: KEARNY WATER DEPARTMENT	PHONE: (201) 991-2700

AND:

EDMUND KNYFD JR. (NUS)

DISCUSSION:

I asked Sharon where Kearny gets their public supply drinking water from; she indicated that their water comes from the Wanaque Reservoir. She also said that there are no wells within the town that drinking water is taken from.

Edmund Knyfd Jr. 4-18-89

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE NO. 12

Surface Water Classifications

Surface Water Quality Standards
N.J.A.C. 7:9-4

Index D-
Surface Water Classifications of the Passaic, Hackensack and N.Y. Harbor Complex Basin

July 1985

[illegible] of New Jersey Department of [illegible] Protection Division of Water Resources

COOLEY BROOK	
(W. Milford) - Entire length, except segments described below	FW2-TP(C1)
(Hewitt) - Segments of the brook and all tributaries located entirely within Hewitt State Forest	FW1 [tp]
CORYS BROOK (Warren) - Entire length	FW2-NT
CRESSKILL BROOK	
(Alpine) - Source to Duck Pond Rd. bridge, Demarest	FW2-TP(C1)
(Demarest) - Duck Pond Rd. bridge to Tenakill Brook	FW2-NT
CUPSAW BROOK	
(Skylands) - Source to Cupsaw Lake dam, except segment described below	FW2-NT
(Skylands) - That segment of Cupsaw Brook above the dam and within the boundaries of Ringwood State Park	FW2-NT(C1)
(Skylands) - Cupsaw Lake dam to mouth	FW2-TM
DEAD RIVER (Liberty Corners) - Entire length	FW2-NT
DEN BROOK (Denville) - Entire length	FW2-NT
DUCK POND (Ringwood)	FW2-NT(C1)
ELIZABETH RIVER	
(Elizabeth) - Source to Broad St. bridge, Elizabeth and all freshwater tributaries	FW2-NT
(Elizabeth) - Broad St. bridge to mouth	SE3
FOX BROOK (Mahwah) - Entire length	FW2-NT
GLASMERE POND (Ringwood)	FW2-NT(C1)
GOFFLE BROOK (Hawthorne) - Entire length	FW2-NT
GRANNIS BROOK (Morris Plains) - Entire length	FW2-NT
GREAT BROOK	
(Chatham) - Entire length, except segment described below	FW2-NT
(Great Swamp) - Segment within the boundaries of the Great Swamp National Wildlife Refuge	FW2-NT(C1)
GREEN BROOK	
(W. Milford) - Entire length, except those segments described below	FW2-TP(C1)
(Hewitt) - Those segments located entirely within the Hewitt State Forest boundaries	FW1 [tp]
GREEN POND (Rockaway)	FW2-TM
GREEN POND BROOK (Picatinny Arsenal) - Green Pond outlet to Rockaway River	FW2-NT
GREENWOOD LAKE (W. Milford)	FW2-TM
* HACKENSACK RIVER	
(Oradell) - Source to Oradell dam	FW2-NT
(Oradell) - Main stem and saline tributaries from Oradell dam to the confluence with Overpeck Creek	SE1
(Little Ferry) - Main stem and saline tributaries from Overpeck Creek to confluence with Berrys Creek	SE2
* (Secaucus) - Main stem from Berrys Creek to Route 1 & 9 crossing	SE2
* (Kearny Point) - Main stem downstream from Route 1 & 9 crossing	SE3

TRIBUTARIES	
(Oradell) - Tributaries joining the main stem between Oradell dam and the confluence with Overpeck Creek	FW2-NT/SE1
(Little Ferry) - Tributaries joining the main stem downstream of Overpeck Creek	FW2-NT/SE2
HANKS POND (Clinton) - Pond and all tributaries	FW1
HARMONY BROOK (Brookside) - Entire length	FW2-TP(C1)
HARRISONS BROOK (Bernards) - Entire length	FW2-NT
HAVEMEYER BROOK (Mahwah) - Entire length	FW2-TP(C1)
HEWITT BROOK (W. Milford) - Entire length	FW2-TP(C1)
HIBERNIA BROOK	
(Hibernia) - Entire length, except tributary described separately below	FW2-TM
(Rockaway) - Entire length of tributary at Rockaway	FW2-TP(C1)
HIGH MOUNTAIN BROOK (Ringwood) - Source to, but not including, Skyline Lake	FW2-TP(C1)
HOHOKUS BROOK (Hohokus) - Entire length	FW2-NT/SE2
HUDSON RIVER	
(Rockleigh) - River and saline portions of New Jersey tributaries from the N.J.-N.Y. boundary line in the north to its confluence with the Harlem River, N.Y.	SE1
(Englewood Cliffs) - River and saline portions of New Jersey tributaries from the confluence with the Harlem River, N.Y. to a north-south line connecting Constable Hook (Bayonne) to St. George (Staten Island, N.Y.)	SE2
TRIBUTARIES	
(Rockleigh) - Freshwater portions of tributaries to the Hudson River in New Jersey	FW2-NT
INDIAN GROVE BROOK (Somersetin) - Entire length	FW2-TM
JACKSON BROOK	
(Mine Hill) - Source to the boundary of Hurd Park, Dover	FW2-TP(C1)
(Dover) - Hurd Park to Rockaway River	FW2-NT
JENNINGS CREEK (W. Milford) - State line to Wanaque River	FW2-TP(C1)
JERSEY CITY RESERVOIR (Boonton)	FW2-TM
KANOUSE BROOK (Newfoundland) - Entire length	FW2-TP(C1)
KIKEOUT BROOK (Butler) - Entire length	FW2-NT
KILL VAN KULL (Bayonne) - Westerly from a north-south line connecting Constable Hook (Bayonne) to St. George (Staten Island, N.Y.)	SE3
LAKE RICKONDA OUTLET STREAM (Monks) - That segment of the outlet stream from Lake Rickonda within Ringwood State Park	FW2-TM(C1)
LAKE STOCKHOLM BROOK	
(Stockholm) - Entire length, except tributaries described separately below	FW2-TM
(Stockholm) - Westerly tributary located entirely within the boundaries of the Newark Watershed	FW1 [tm]

(Stockholm) - Brook between Hamburg Turnpike and Williamsville-Stockholm Rd. to its confluence with Lake Stockholm Brook, north of Rt. 23	FW1 [tm]
LITTLE POND BROOK (Oakland) - Entire length	FW2-TP(C1)
LOANTAKA BROOK	
(Green Village) - Entire length, except segment described below	FW2-NT
(Great Swamp) - Brook and all tributaries within the boundaries of Great Swamp National Wildlife Refuge	FW2-NT(C1)
LUD-DAY BROOK	
(Camp Garfield) - Source to confluence with a tributary from Camp Garfield	FW1
MACOPIN RIVER	
(Newfoundland) - Source to Echo Lake dam	FW2-NT
(Newfoundland) - Echo Lake dam to Pequannock River	FW2-TM
MEADOW BROOK (Wanaque) - Skyline Lake to Wanaque River	FW2-NT
MILL BROOK	
(Randolph) - Source to Rt. 10 bridge	FW2-TP(C1)
(Randolph) - Rt. 10 bridge to Rockaway River	FW2-NT
MORSES CREEK - Entire length	FW2-NT/SE3
MOSSMAN'S BROOK - See CLINTON BROOK	
MT. TABOR BROOK (Morris Plains) - Entire length	FW2-NT
* NEWARK BAY (Newark) - North of an east-west line connecting Elizabethport with Bergen Pt., Bayonne up to the mouths of the Passaic and Hackensack Rivers	SE3
NOSENZO POND (Upper Macopin)	FW2-NT(C1)
OAK RIDGE RESERVOIR (Oak Ridge)	FW2-TM
OAK RIDGE RESERVOIR (Oak Ridge) - Northwestern tributary to Reservoir	FW1 [tm]
OVERPECK CREEK (Palisades Park) - Entire length	FW2-NT/SE2
PECKMAN RIVER (Verona) - Entire length	FW2-NT
PACACK BROOK	
(Stockholm) - Source to Pequannock River, excluding Canistear Reservoir, except segments described separately below	FW2-NT
(Canistear) - Brook and tributaries upstream of Canistear Reservoir located entirely within the boundaries of the Newark Watershed	FW1
PASSAIC RIVER	
(Mendham) - Source to Rt. 202 bridge (Van Doren's Mill), except tributaries described separately below	FW2-TM
(Paterson) - Rt. 202 bridge to Dundee Lake dam	FW2-NT
(Little Falls) - Dundee Lake dam to confluence with Second River	FW2-NT/SE2
(Newark) - Confluence with Second River to mouth	SE3

REFERENCE NO. 13

Surface Water Quality Standards

SURFACE WATER QUALITY STANDARDS

N.J.A.C. 7:9-4.1 et seq.

May 1985

New Jersey Department of Environmental Protection/Division of Water Resources

characteristics, but are suitable for a wide variety of other fish species.

"NPDES" means National Pollutant Discharge Elimination System.

"NT" means nontrout waters.

"Nutrient" means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the growth and development of organisms.

"Outstanding National Resource Waters" means high quality waters that constitute an outstanding national resource (for example, waters of National/State Parks and Wildlife Refuges and waters of exceptional recreational or ecological significance) as designated in Index G incorporated into this subchapter.

"Persistent" means relatively resistant to degradation, generally having a half life of over 96 hours.

"Pinelands waters" means all waters within the boundaries of the Pineland Area, except those waters designated as FW1 in this subchapter, as established in the Pinelands Protection Act N.J.S.A. 13:18A-1 et seq. and shown on Plate 1 of the "Comprehensive Management Plan" adopted by the New Jersey Pinelands Commission in November 1980.

"PL" means the general surface water classification applied to Pinelands Waters.

"Primary contact recreation" means recreational activities that involve significant ingestion risks and includes, but is not limited to, wading, swimming, diving, surfing, and water skiing.

"Public hearing" means a legislative type hearing before a representative or representatives of the Department providing the opportunity for public comment, but does not include cross-examination.

"River mile" means the distance, measured in statute miles, between two locations on a stream, with the first location designated as mile zero. Mile zero for the Delaware River is located at the intersection of the centerline of the navigation channel and a line between the Cape May Light, New Jersey, and the tip of Cape Henlopen, Delaware.

"Saline waters" means waters having salinities generally greater than 3.5 parts per thousand at mean high tide.

"SC" means the general surface water classification applied to coastal saline waters.

* "SE" means the general surface water classification applied to saline waters of estuaries.

(c) In all FW2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;

2. Primary and secondary contact recreation;

3. Industrial and agricultural water supply;

4. Public potable water supply after such treatment as required by law or regulation; and

5. Any other reasonable uses.

(d) In all SE1 waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;

2. Maintenance, migration and propagation of the natural and established biota;

3. Primary and secondary contact recreation; and

4. Any other reasonable uses.

(e) In all SE2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;

2. Migration of diadromous fish;

3. Maintenance of wildlife;

4. Secondary contact recreation; and

5. Any other reasonable uses.

(f) In all SE3 waters the designated uses are:

1. Secondary contact recreation;

2. Maintenance and migration of fish populations;

3. Migration of diadromous fish;

4. Maintenance of wildlife; and

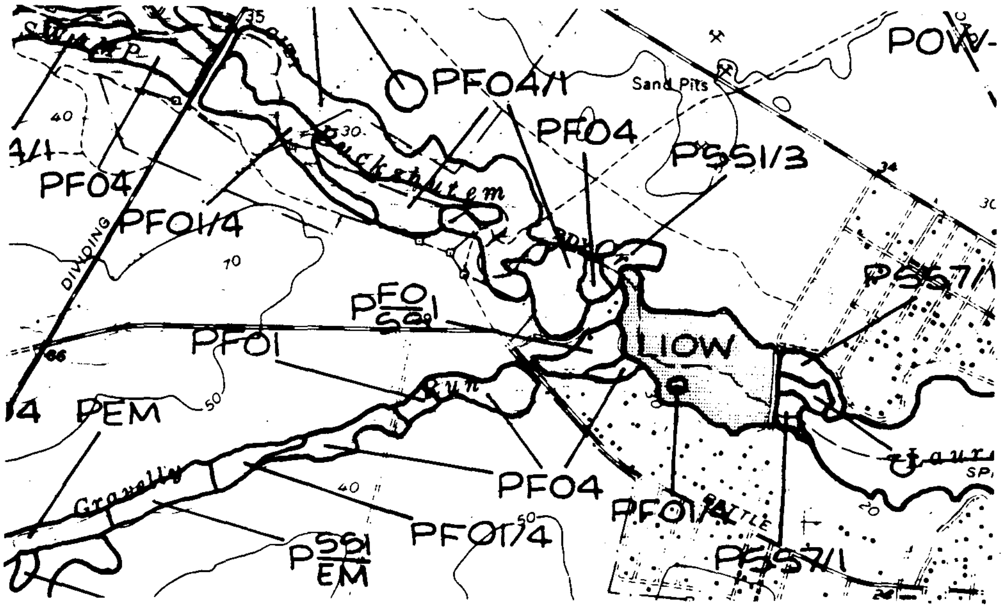
5. Any other reasonable uses.

(g) In all SC waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;

REFERENCE NO. 14

ATLAS
OF
NATIONAL WETLANDS INVENTORY MAPS
FOR
NEW JERSEY



PORTION OF DIVIDING CREEK MAP

SCALE: 1:24,000

UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Region Five
Habitat Resources
One Gateway Center, Suite 700
Newton Corner, Massachusetts

1984

HOW TO USE THIS ATLAS

The Atlas contains reductions of all 1:24,000 National Wetlands Inventory maps. Maps appear in alphabetical order. Map names can be located on the index map (Figure 2). Each map shows the configuration, location and type of wetlands and deepwater habitats found within a given area.

WETLAND LEGEND

Wetland data are displayed on maps by a series of letters and numbers (alpha-numerics). Mixing of classes and subclasses are represented by a diagonal line. The more common symbols are shown below; less common symbols have been omitted for simplicity. For identifying these latter symbols, the reader should refer to an actual NWI map legend.

Examples of Alpha-numerics:

E2EMN6	=	Estuarine (E), Intertidal(2), Emergent Wetland(EM), Regularly Flooded(N), Oligohaline(6)
E2FL	=	Estuarine(E), Intertidal(2), Flat(FL)
PF01	=	Palustrine(P), Forested Wetland(FO), Broad-leaved Deciduous(1)
PEM/OW	=	Palustrine(P), Emergent Wetland/Open Water(EM/OW)
PFO/SS1	=	Palustrine(P), Forested Wetland/Scrub-Shrub Wetland(FO/SS), Broad-leaved Deceduous(1)

SYMBOLOGY

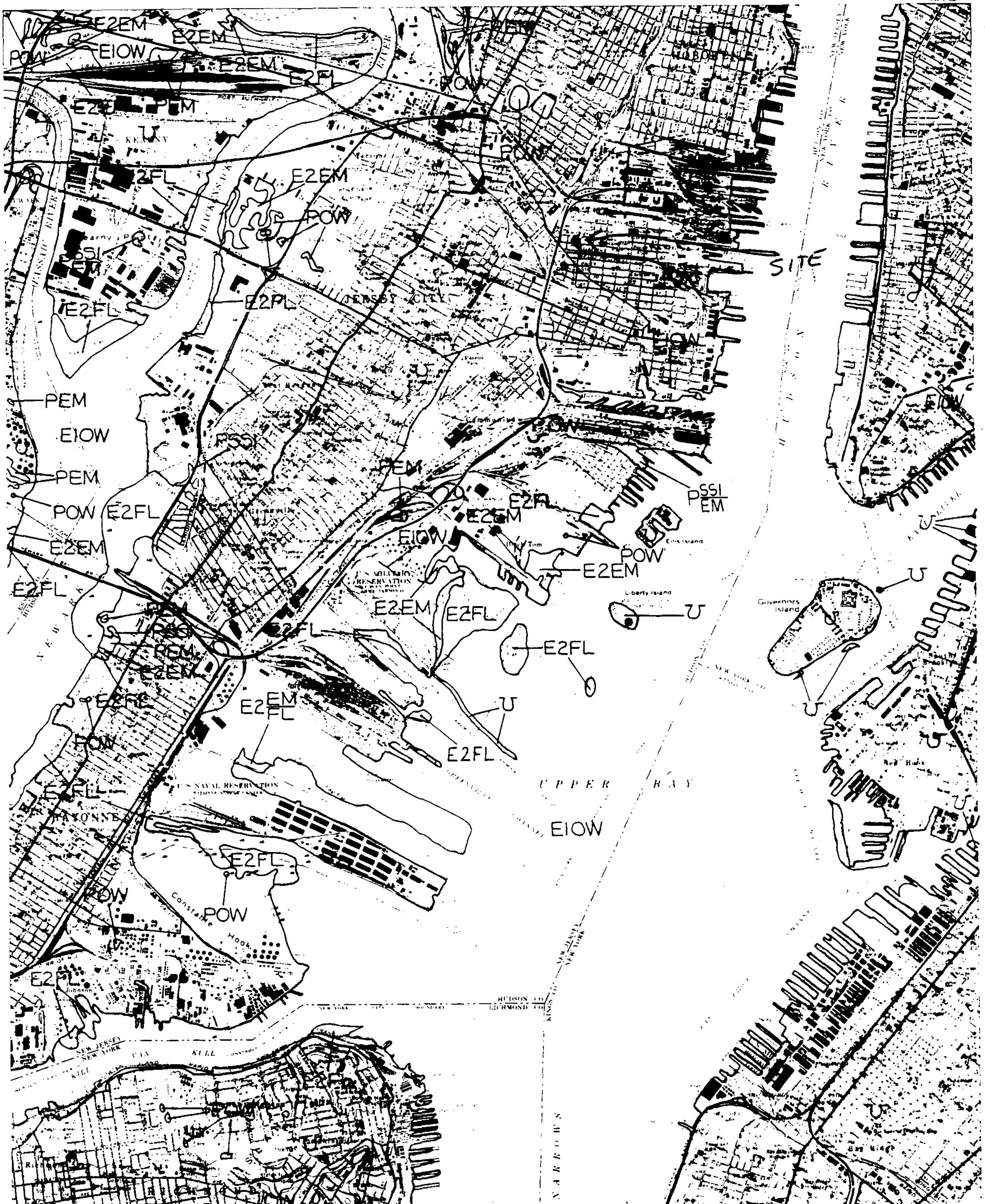
Systems and Subsystems:

M 1	=	Marine Subtidal	R 3	=	Riverine Upper Perennial
M 2	=	Marine Intertidal	R 4	=	Riverine Intermittent
E 1	=	Estuarine Subtidal	L 1	=	Lacustrine Limnetic
E 2	=	Estuarine Intertidal	L 2	=	Lacustrine Littoral
R 1	=	Riverine Tidal	P	=	Palustrine
R 2	=	Riverine Lower Perennial	U	=	Upland

Classes (subclasses and modifers designated where appropriate):

AB = Aquatic Bed
BB = Beach/Bar
EM = Emergent Wetland
    EMN6 = Emergent Wetland, Regularly Flooded, Oligohaline
    EMP6 = Emergent Wetland, Irregularly Flooded, Oligohaline
    EMR = Emergent Wetland, Seasonally Flooded-Tidal
FL = Flat
FO1 = Forested Wetland, Broad-leaved Deciduous
FO2 = Forested Wetland, Needle-leaved Deciduous
FO4 = Forested Wetland, Needle-leaved Evergreen
OW = Open Water/Unknown Bottom
SS1 = Scrub=Shrub Wetland, Broad-leaved Deciduous
SS3 = Scrub-Shrub Wetland, Broad-leaved Evergreen
SS4 = Scrub-Shrub Wetland, Needle-leaved Evergreen
SS5 = Scrub-Shrub Wetland, Dead
SS7 = Scrub-Shrub Wetland, Evergreen

NATIONAL WETLANDS INVENTORY
UNITED STATES DEPARTMENT OF THE INTERIOR



NEWARK NE
NEWARK

JERSEY CITY NJ

REFERENCE NO. 15

TERRESTRIAL ORGANISMS

Shown in BROWN; species with special status shown in RED-(F) or (S) indicates species protected by Federal or State Legislation (see text)

SYMBOL SPECIES

PLANTS (301-350)

301 Eastern hemlock
302 Spleenwort (S)
303 Spider lily (S)
304 Pond bush (S)
305 Watermilfoil (S)
306 Hooded pitcher plant (S)
307 Tree
308 Prickly pear cactus (S)
309 Trailing arbutus (S)
310 Eastern bumelia
311 Pitcher plant
312 Baldcypress
313 Redbay
314 Seaside alder
315 Box huckleberry
316 Purple fringeless orchid
317 Pink lady's slipper
318 Ebony spleenwort (S)
319 Orchids (S)
320 Golden club (S)
321 Florida beargrass
322 East-coast coontie
323 Fall-flowering ixia
324 Jackson-vine
325 Spoon-flower
326 Curtiss milkweed
327 Sea lavender
328 Hand fern
329 Needle palm
330 Yellow squirrel-banana
331 Beach creeper
332 Florida coontie
333 Four-petal pawpaw
334 Bird's nest spleenwort
335 Burrowing four-o'clock
336 Beach star
337 Silver palm
338 Dancing lady orchid
339 Tamarindillo
340 Fuch's bromeliad
341 Everglades peperomia
342 Buccaneer palm
343 Slender spleenwort
344 Pineland jacquemontia
345 Mahogany mistletoe
346 Florida thatch
347 Twisted air plant
348 Long's bittercress
349 Venus's flytrap

INVERTEBRATES (351-400)

351 Monarch butterfly
352 Zebra butterfly

BIRDS (401-600)

SHOREBIRDS (401-430)

401 Shorebirds
402 Terns
403 Gulls
404 Forster's tern
405 Arctic tern
406 Least tern (S)
407 Roseate tern (S)
408 Common tern
409 Great black-backed gull
410 Herring gull
411 Laughing gull
412 Black skimmer (S)
413 Turnstones
414 Plovers
415 Piping plover
416 American oystercatcher (S)

WADING BIRDS (431-460)

431 Wading birds
432 Herons
433 Egrets
434 Rails

Newark

N. J.—N. Y.—PA.

1:250 000-scale map of

Atlantic Coast Ecological Inventory

Produced by

U. S. FISH AND WILDLIFE SERVICE

1980

INVERTEBRATES (351–400)

351 Monarch butterfly
352 Zebra Butterfly

BIRDS (401–600)

SHOREBIRDS (401–430)

401 Shorebirds
402 Terns
403 Gulls
404 Forster's tern
405 Arctic tern
406 Least tern (S)
407 Roseate tern (S)
408 Common tern
409 Great black-backed gull
410 Herring gull
411 Laughing gull
412 Black skimmer (S)
413 Turnstones
414 Plovers
415 Piping plover
416 American oystercatcher (S)

WADING BIRDS (431–460)

431 Wading birds
432 Herons
433 Egrets
434 Rails
435 Ibises
436 Bitterns
437 Great blue heron (S)
438 Wood ibis (S)
439 Anhinga
440 Little blue heron (S)
441 Yellow-crowned night heron (S)
442 Black-crowned night heron
443 Florida sandhill crane (S)
444 Louisiana heron (S)
445 Limpkin (S)
446 Roseate spoonbill (S)
447 Snowy egret (S)
448 Magnificent frigate-bird (S)
449 Reddish egret (S)
450 Clapper rail
451 King rail
452 Virginia rail
453 Sora rail

WATERFOWL (461–500)

461 Waterfowl
462 Swans
463 Geese
464 Dabbling ducks
465 Diving ducks
466 Common eider
467 Harlequin duck
468 Wood duck
469 Fulvous tree duck
470 Loons
471 Grebes
472 Brant geese
473 Snow goose
474 Gadwall
475 Black duck

RAPTORS (501–530)

501 Raptors
502 Owls
503 Kites
504 Hawks
505 Bald eagle (F)
506 Osprey (S)
507 Peregrine falcon (F)
508 Copper's hawk (S)
509 Swallow-tailed kite
510 Marsh hawk (S)
511 Southeastern American kestrel (S)
512 Florida burrowing owl (S)

SEABIRDS (531–550)

531 Seabirds
532 Petrels, shearwaters, and albatroses
533 Pelican and allies
534 Alcids
535 Brown pelican (F)
536 Black guillemot
537 Leach's petrel
538 Razorbill
539 Common puffin
540 Double-crested cormorant
541 Gannet
542 Wilson's petrel
543 Northern phalarope
544 Audubon's shearwater
545 Greater shearwater
546 Shearwaters
547 Petrels
548 Jaegers
549 White pelican

SONGBIRDS AND OTHERS (551–600)

551 Songbirds and others
552 Red-cockaded woodpecker (F)
553 Chachalaca
554 Bachman's warbler (F)
555 Wild turkey
556 American woodcock
557 Pileated woodpecker
558 Swainson's warbler
559 Ruffed grouse
560 Bobwhite
561 Mourning dove
562 Warblers
563 Ring-necked pheasant
564 Bank swallow
565 Dusky seaside sparrow (F)
566 White-crowned pigeon (S)

REPTILES AND AMPHIBIANS (601–700)

601 Eastern narrow-mouthed toad (S)
602 Eastern indigo snake (F)
603 American alligator (F)

Produced by
U. S. FISH AND WILDLIFE SERVICE
1980

AQUATIC ORGANISMS

Shown in BLUE; species with special status shown in RED (F) or (S) indicates species protected by Federal or State Legislation (see text)

SYMBOL	SPECIES

PLANTS (1–50)

1 Irish moss
2 Rockweed

INVERTEBRATES (51–100)

51 Crabs
52 Mussels
53 Oysters
54 Scallops
55 Clams
56 Worms
57 Shrimp
58 American lobster
59 Blue crab
60 Eastern oyster
61 European oyster
62 Bay scallop
63 Deep-sea scallop
64 Calico scallop
65 Surf clam
66 Hard clam
67 Soft shell clam
68 Brackish-water clam
69 Bloodworm
70 Sandworm
71 White shrimp
72 Brown shrimp
73 Northern shrimp
74 Rock crab
75 Jonah crab
76 Whelk
77 Ocean quahog
78 Pink shrimp
79 Stone crab
80 Spiny lobster

FISH (101–200)

101 Sharks, skates, rays
102 Herring
103 Salmon and trout
104 Catfish
105 Cod
106 Sunfish and bass
107 Drum
108 Flatfish
109 Longnose gar
110 Shortnose sturgeon (F)
111 Atlantic sturgeon (S)
112 American eel
113 Blueback herring
114 Hickory shad
115 Alewife
116 American shad (S)
117 Atlantic menhaden
118 Atlantic herring
119 Gizzard shad
120 Tarpon
121 Atlantic salmon
122 White catfish
123 Channel catfish
124 Yellow bullhead
125 Brown bullhead
126 Flat bullhead
127 Sea catfish
128 White perch
129 Striped bass
130 Black sea bass
131 Redbreast sunfish
132 Warmouth
133 Bluegill
134 Largemouth bass
135 Black crappie
136 Sheepshead
137 Spotted seatrout
138 Weakfish
139 Spot
140 Atlantic croaker
141 Southern kingfish
142 Northern kingfish
143 Gulf kingfish
144 Red drum
145 Star drum
146 Black drum
147 Summer flounder

536 Black guillemot
537 Leach's petrel
538 Razorbill
539 Common puffin
540 Double-crested cormorant
541 Gannet
542 Wilson's petrel
543 Northern phalarope
544 Audubon's shearwater
545 Greater shearwater
546 Shearwaters
547 Petrels
548 Jaegers
549 White pelican

SONGBIRDS AND OTHERS (551–600)

551 Songbirds and others
552 Red-cockaded woodpecker (F)
553 Chachalaca
554 Bachman's warbler (F)
555 Wild turkey
556 American woodcock
557 Pileated woodpecker
558 Swainson's warbler
559 Ruffed grouse
560 Bobwhite
561 Mourning dove
562 Warblers
563 Ring-necked pheasant
564 Bank swallow
565 Dusky seaside sparrow (F)
566 White-crowned pigeon (S)

REPTILES AND AMPHIBIANS (601–700)

601 Eastern narrow-mouthed toad (S)
602 Eastern indigo snake (F)
603 American alligator (F)
604 Northern diamondback terrapin
605 Amphibians
606 Greater siren
607 Bog turtle (S)
608 Gopher tortoise (S)
609 Eastern tiger salamander (S)
610 Northern fence lizard
611 Five-lined skink
612 Map turtle
613 Plymouth red-bellied turtle (F)
614 Eastern diamondback rattlesnake
615 Carolina gopher frog
616 Florida gopher frog (S)
617 Atlantic salt marsh watersnake (F)
618 American crocodile (F)
619 Florida Keys mole skink (S)
620 Florida black-headed snake (S)
621 Pine barrens tree frog (S)
622 Northern pine snake (S)
623 Corn snake (S)
624 Timber rattlesnake (S)
625 Southern gray tree frog (S)

MAMMALS (701–800)

701 Beaver
702 Whitetail deer
703 European fallow deer
704 Blackbeard Island deer
705 Opossum
706 Marsh rabbit
707 Rice rat
708 Raccoon
709 St. Simon Island raccoon
710 Mink
711 River otter (F)
712 Feral hog
713 Feral cow
714 Cumberland Island pocket gopher
715 Anastasia Island cotton mouse
716 Aquatic furbearers
717 Black bear (S)
718 Bobcat
719 Eastern gray squirrel
720 Eastern fox squirrel
721 Eastern cottontail
722 Delmarva fox squirrel (F)
723 Muskrat
724 Red fox
725 Bats
726 Gray fox
727 Striped skunk
728 Nutria
729 Longtail weasel
730 Colonial pocket gopher (S)
731 Wild ponies
732 Sika deer
733 Beach meadow vole
734 Block Island meadow vole
735 Pallid beach mouse (S)
736 Sherman's fox squirrel (S)
737 Florida mouse (S)
738 Florida panther (F)
739 Goff's pocket gopher (S)
740 Key Largo wood rat (S)
741 Lower keys cotton rat (S)
742 Key Largo cotton mouse (S)

HABITAT USE

Shown in RED for species with special status, BLUE for aquatic organisms and BROWN for terrestrial organisms

a Spawning ground
b Nursery
c Commercial harvesting area
d Adult concentration
e Overwintering area
f Sport fishing/hunting area
g Migratory area
h Nesting area
i Unusual distribution or specimen

112 American eel
113 Blueback herring
114 Hickory shad
115 Alewife
116 American shad (S)
117 Atlantic menhaden
118 Atlantic herring
119 Gizzard shad
120 Tarpon
121 Atlantic salmon
122 White catfish
123 Channel catfish
124 Yellow bullhead
125 Brown bullhead
126 Flat bullhead
127 Sea catfish
128 White perch
129 Striped bass
130 Black sea bass
131 Redbreast sunfish
132 Warmouth
133 Bluegill
134 Largemouth bass
135 Black crappie
136 Sheepshead
137 Spotted seatrout
138 Weakfish
139 Spot
140 Atlantic croaker
141 Southern kingfish
142 Northern kingfish
143 Gulf kingfish
144 Red drum
145 Star drum
146 Black drum
147 Summer flounder
148 Southern flounder
149 Winter flounder
150 Rainbow smelt
151 Atlantic tomcod
152 Threadfin shad
153 Carp
154 Atlantic mackerel
155 Chain pickerel
156 White bass
157 Northern puffer
158 Silver perch
159 Florida pompano
160 Bluefish
161 Spanish mackerel
162 Cobia
163 Mullet
164 White crappie
165 Redear sunfish
166 Smallmouth bass
167 Yellow perch
168 Pumpkinseed
169 Atlantic halibut
170 Atlantic cod
171 Pollock
172 Haddock
173 Hake
174 Bluefin tuna
175 Walleye
176 Northern pike
177 Scup
178 Tautog
179 Atlantic spadefish
180 Bay anchovy
181 Butterfish
182 Little tunny
183 Atlantic bonito
184 Brown trout
185 Cunner
186 Yellowtail flounder
187 Gulf flounder
188 Pinfish
189 King mackerel
190 Pigfish
191 White grunt
192 Tripletail
193 Ladyfish
194 Snook
195 Jack
196 Snapper
197 Grouper
198 Sailfish
199 Great barracuda
200 Maryland darter (F)

REPTILES AND AMPHIBIANS (201–250)

201 Green sea turtle (F)
202 Loggerhead sea turtle (F)
203 Hawksbill turtle (F)
204 Atlantic ridley turtle (F)
205 Leatherback turtle (F)

MAMMALS (251–300)

251 Florida manatee (F)
252 Atlantic bottlenose dolphin
253 Pigmy sperm whale
254 Short-finned pilot whale
255 Harbor seal
256 Gray seal
257 Right whale (F)
258 Atlantic spotted dolphin

High salinity estuarine habitat (generally 16.5 to 30 parts per thousand); arrows used for wide estuaries.

Mid salinity estuarine habitat (generally 5 to 16.5 parts per thousand).

Low salinity estuarine habitat (generally 0.5 to 5 parts per thousand) and tidal freshwater.

Non-tidal freshwater riverine and creek habitat.

LAND USE–LAND COVER SYMBOLS

Study area (coastal zone boundary to three-mile limit)

Special land use areas, including refuges and wildlife management areas, parks and seashores; may be used in lieu of habitat boundary

Subdivision of a special land use area into more than one designation

Swamp

Marsh

Beach/Dunes

Seagrass

Reef

POINT AND AREA FEATURE SYMBOLS

(shown in RED for species with special status; shown in BLUE for aquatic organisms; and shown in BROWN for terrestrial organisms)

Localized concentration of species 800h

General habitat boundary for indicated species; may be superceded by special land use boundary 100d

ATLANTIC COAST ECOLOGICAL INVENTORY
NEW YORK, N. Y.–CONN.–N. J.
1980

LEGEND

POPULATED PLACES

Over 500,000 BOSTON

100,000 to 500,000 RICHMOND

25,000 to 100,000 EVANSTON

5,000 to 25,000 Newnan

1,000 to 5,000 Bar Harbor

Less than 1,000 Fishkill

ROADS

Primary, all-weather, hard surface

Secondary, all-weather, hard surface

Light-duty, all-weather, improved surface

Fair or dry weather, unimproved surface

Trail

Interchange

Route markers: Interstate, U.S., State 95 29 193

RAILROADS Single track Double or Multiple

Standard gauge

Narrow gauge

BOUNDARIES

International

State

County

Park or reservation

Mine

Spot elevation in feet 221

Landplane airport

Landing area

Seaplane airport

Seaplane anchorage

Power line

Woods-brushwood

Landmarks: School; Church; Other

Depth curve in feet 30

Limit of danger; Reef

Rocks: Awash

Foreshore flat Mud

Intermittent or dry stream

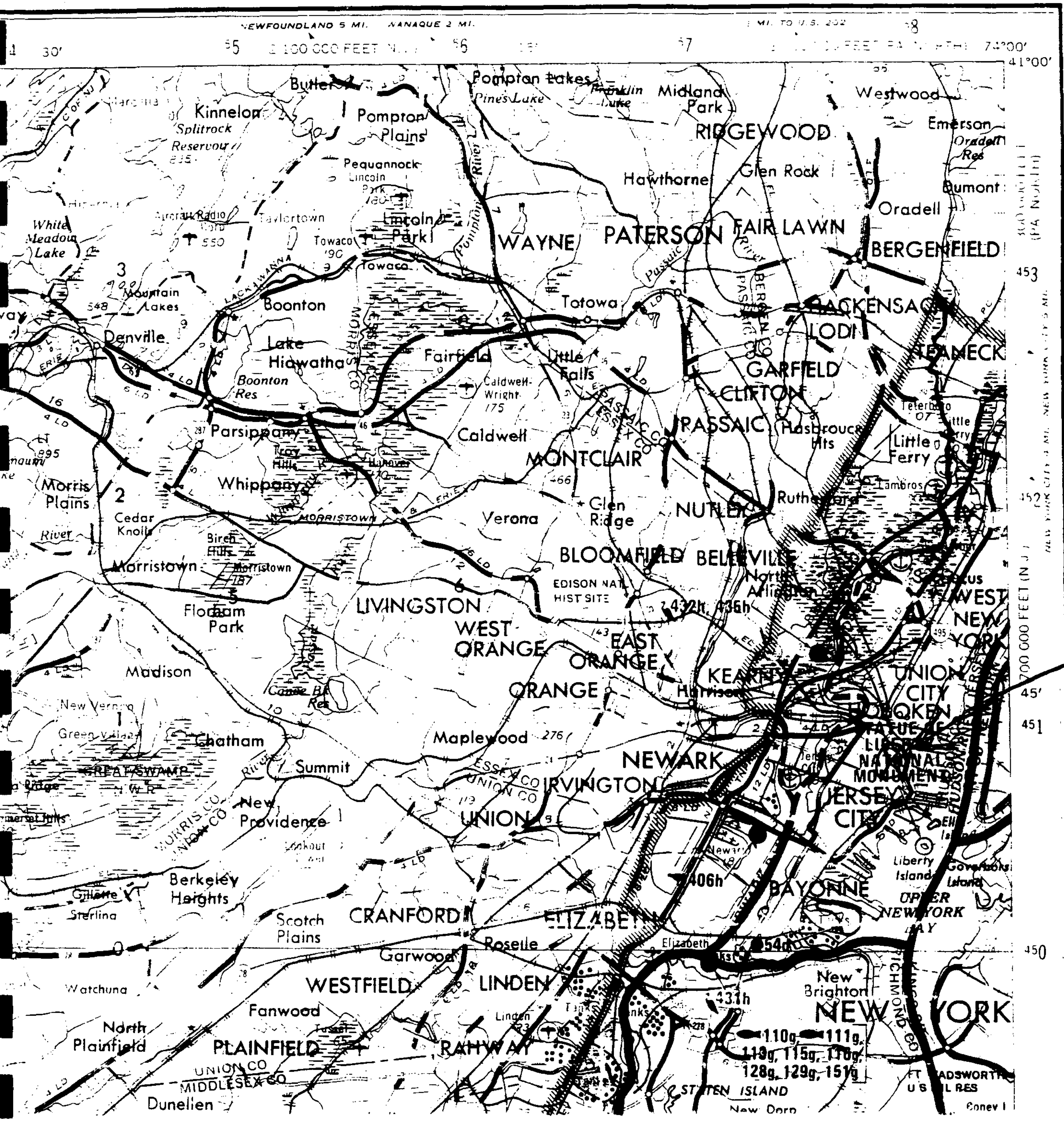
Marsh or swamp

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1980

Produced by U. S. Fish and Wildlife Service

Base map prepared by U. S. Geological Survey 1969

Atlantic coast ecological inventory compiled in 1980 by Fish and Wildlife Service from data furnished by Federal agencies, State agencies, and other sources. Map scale limitation precludes the portrayal of all available information on species occurrence and distribution. A detailed text—Atlantic Coast Ecological Inventory—is available from Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402



APPROX. SITE LOCATION

Scale 1:250,000

5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometers

5 0 5 10 15 Nautical Miles

TRANSVERSE MERCATOR PROJECTION

BLACK NUMBERED LINES INDICATE THE 10,000 METER UNIVERSAL TRANSVERSE MERCATOR GRID, ZONE 18

FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092, OR DENVER, COLORADO 80225

REFERENCE NO. 16

STATE OF NEW JERSEY

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DAVID J. BARDIN, COMMISSIONER

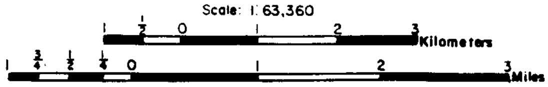
WATER SUPPLY OVERLAY
SHEET 26

LEGEND

- AREA SERVED BY PRIVATE WATER SERVICE COMPANIES
- AREA SERVED BY REGIONALLY OWNED WATER SERVICE COMPANIES
- AREA SERVED BY MUNICIPALLY OWNED WATER SERVICE COMPANIES
- AREA NOT PRESENTLY SERVED BY WATER SERVICE
- PUBLIC SUPPLY WELLS
- SURFACE WATER INTAKE
- —W— MAJOR WATER MAINS
- TOWNSHIP BOUNDARIES
- COUNTY BOUNDARIES
- STATE BOUNDARIES

ALL MAP COORDINATES ARE FOR THE LOWER LEFT HAND CORNER.

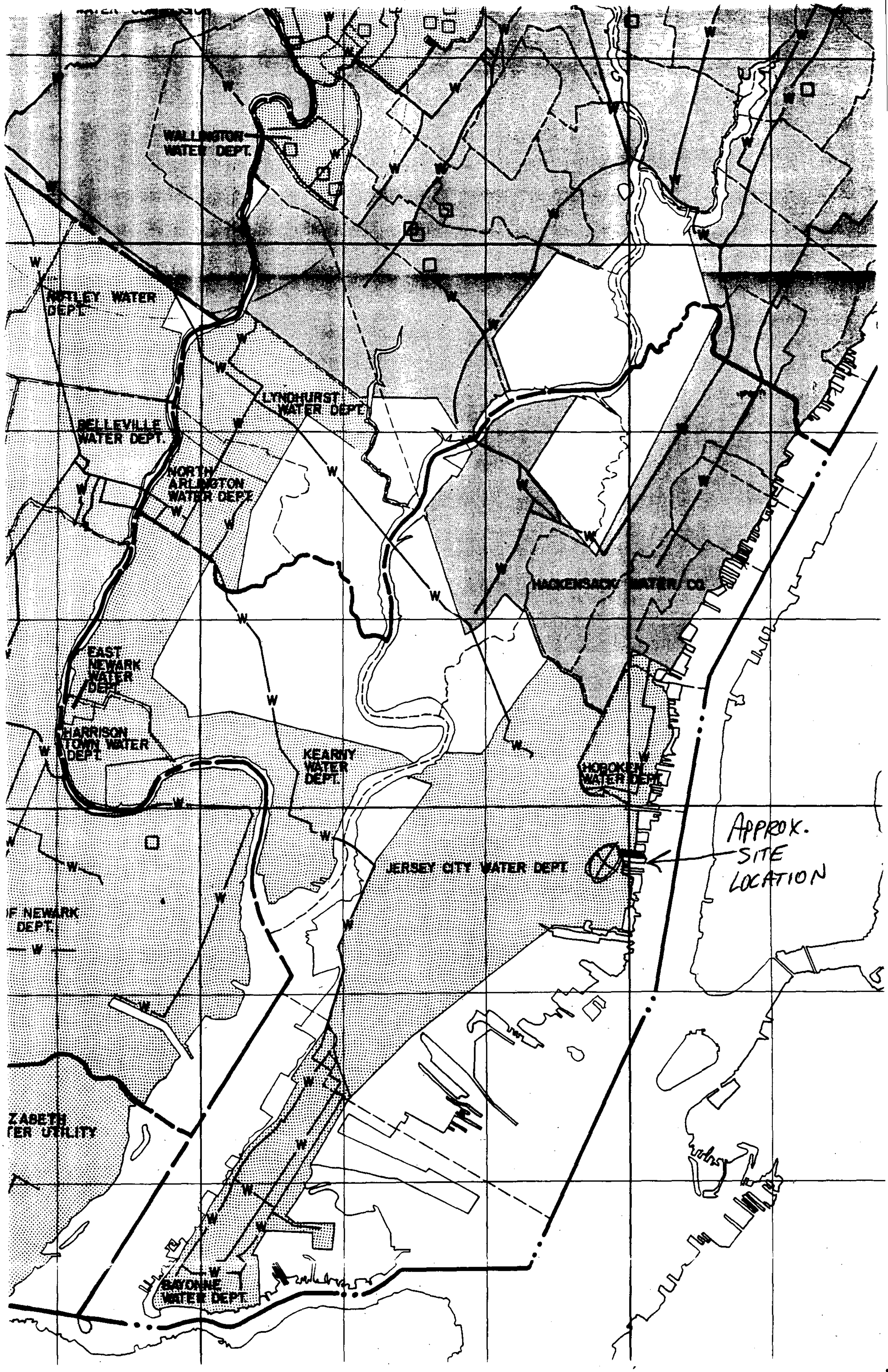
Scale: 1: 63,360



SUPERVISED BY GEORGE J. HALASI-KUN, TOPOGRAPHIC ENGINEER
DRAFTED BY JOHN F. OLSCHEWSKI

ANY CORRECTIONS OR ADDITIONAL INFORMATION WILL BE APPRECIATED

AUGUST 1975



WALLINGTON WATER DEPT.
NUTLEY WATER DEPT.
LYNDHURST WATER DEPT.
BELLEVILLE WATER DEPT.
NORTH ARLINGTON WATER DEPT.
HACKENSACK WATER CO.
EAST NEWARK WATER DEPT.
HARRISON TOWN WATER DEPT.
KEARNY WATER DEPT.
HOBOKEN WATER DEPT.
APPROX. SITE LOCATION
JERSEY CITY WATER DEPT.
F NEWARK DEPT.
ZABETH TER UTILITY
BAYONNE WATER DEPT.

REFERENCE NO. 17

GSC-TR8645

GRAPHICAL EXPOSURE MODELING SYSTEM

(GEMS)

USER'S GUIDE

VOLUME 2. MODELING

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION
Task No. 3-2
Contract No. 68023970
Project Officer: Russell Kinerson
Task Manager: Loren Hall

Prepared by:

GENERAL SCIENCES CORPORATION
8401 Corporate Drive
Landover, Maryland 20785

Submitted: December 1, 1986

GEMS> I

EIGHTH STREET SITE
LATITUDE 40:43:37 LONGITUDE 74: 3: 5 1980 POPULATION

	1/4	1/2	1	2	3	4	
KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	4008	15629	49391	130688	202835	372022	774573
RING TOTALS	4008	15629	49391	130688	202835	372022	774573

GEMS> I

EIGHTH STREET SITE
LATITUDE 40:43:37 LONGITUDE 74: 3: 5 1980 HOUSING

	1/4	1/2	1	2	3	4	
KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	1428	5300	18930	47632	95765	174859	343914
RING TOTALS	1428	5300	18930	47632	95765	174859	343914

	POPULATION	HOUSING
1 MILE	69028	25658
2 MILES	199716	73290
3 MILES	402551	169055
4 MILES	774573	343914

REFERENCE NO. 18

PRELIMINARY ASSESSMENT
OFF SITE RECONNAISSANCE
INFORMATION REPORTING FORM

Date: 4/20/89

Site Name: EIGHTH STREET SITE TDD: 02-8904-06

Site Address: EIGHTH STREET (BETWEEN DIVISION + BRUNSWICK STREETS)
Street, Box, etc.

JERSEY CITY
Town

HUDSON
County

NEW JERSEY
State

NUS Personnel:

Name	Discipline
JOSEPH SORIANO	BIOLOGIST
PAUL BAUER	ENVIRONMENTAL SCIENTIST

Weather Conditions (clear, cloudy, rain, snow, etc.):

CLEAR, SUNNY

Estimated wind direction and wind speed: 10-15 mpH NORTH

Estimated temperature: 70° F

Signature: Paul Bauer Date: 4/20/89

Countersigned: [signature] Date: 4/20/89

PRELIMINARY ASSESSMENT

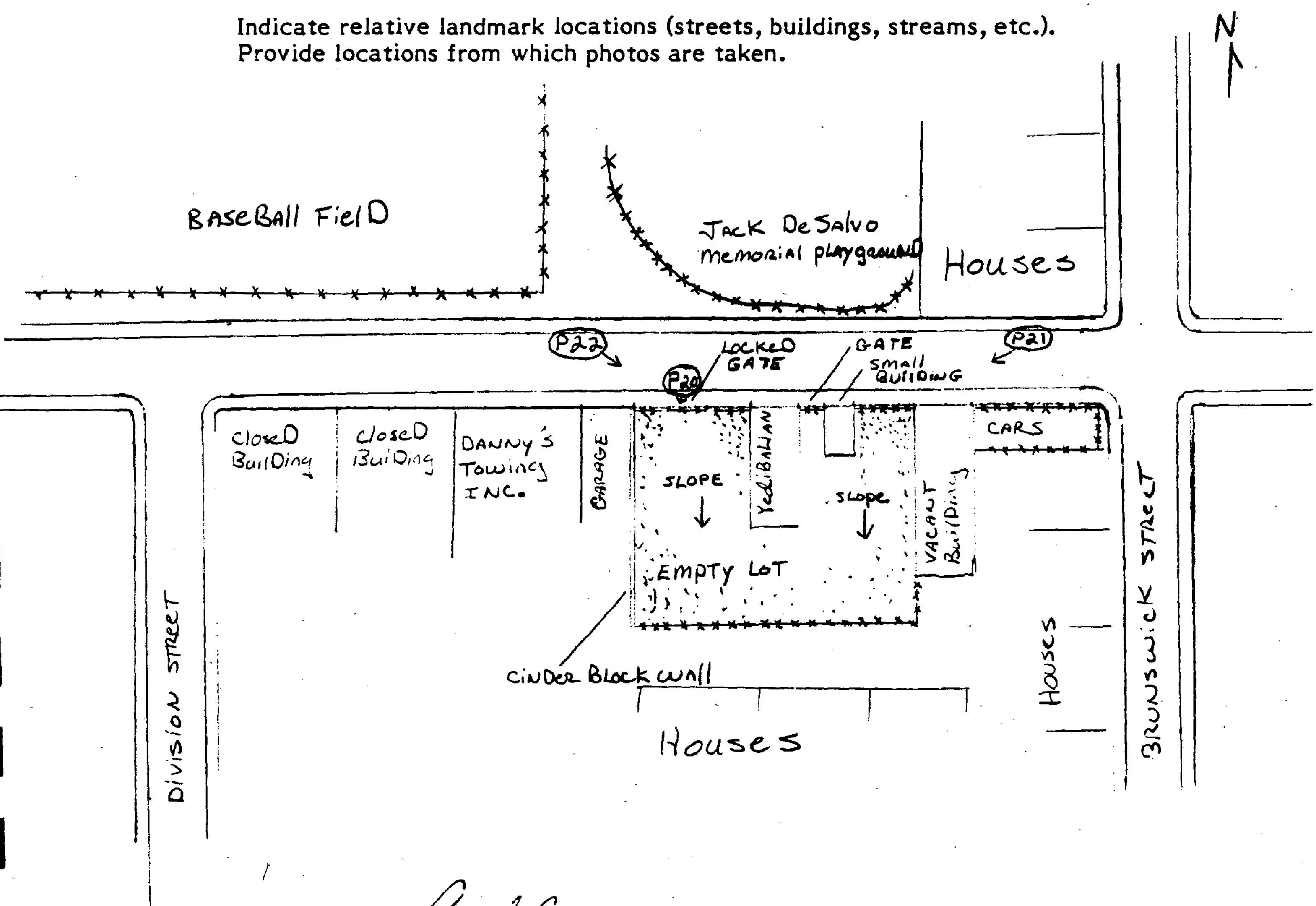
INFORMATION REPORTING FORM

Date: 4/20/89

Site Name: EIGHTH STREET SITE TDD: 02-8904-06

Site Sketch:

Indicate relative landmark locations (streets, buildings, streams, etc.). Provide locations from which photos are taken.



Signature: Paul Bauer Date: 4/20/89

Countersigned: Joseph ... Date: 4/20/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 4/20/89

Site Name: EIGHTH STREET SITE TDD: 02-8904-06

Notes (Cont'd):

ARRIVED ON SITE AT 1445 HOURS. THE EIGHTH STREET SITE IS AN EMPTY LOT CONSISTING OF A GRAVEL BASE OVERGROWN IN AREAS WITH WEEDS. THE LOT IS ENCLOSED BY A HIGH CHAIN LINK FENCE WITH A LOCKED GATE FACING EIGHTH STREET. THE LOT IS STREWN WITH BROKEN CINDER BLOCKS, SOME OLD WOOD, AND MISCELLANEOUS TRASH. THERE ARE NO PILES OF MATERIALS, THE BRICKS AND AND TRASH ARE DISPERSED OVER THE ENTIRE LOT. THERE WAS NO STAINED SOIL OR STRESSED VEGATATION OBSERVED. THE BOUNDRIES OF THE LOT ARE NOT CLEAR. IT MAY BE ONE LARGE LOT WITH A SMALL STORE IN THE MIDDLE (G.K. YEDIBALIAN) OR IT MAY BE SEVERAL SEPARATE PROPERTIES (REFER TO SITE SKETCH). IF IT IS ONE LARGE PROPERTY THEN THE ENTIRE PROPERTY WAS NOT VISIBLE. THE AREA BEHIND G.K. YEDIBALIAN WAS NOT VISIBLE, ALSO THE VACANT LOT TO THE LEFT OF YEDIBALIAN'S (FACING THE SITE FROM EIGHT STR.) WAS NOT COMPLETELY VISIBLE DUE TO HIGH WEEDS ALONG THE FENCE.

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: [signature] Date: 4/20/89

Countersignature: [signature] Date: 4/20/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 4/20/89

Site Name: EIGHTH STREET TDD: 02-8904-06

Notes (Periodically indicate time of entries in military time):

YediBalian's is a small one story wooden shack in poor condition. People were observed entering and leaving the store. There was no surface water observed in the area. The site slopes very gently away from eighth street. The path of any surface water runoff was not apparent. Left site at 1540 hours.

SIGN:

Danny's Towing Inc.
385 8TH STREET
659-3005

G.Y. YediBalian
SCREWS NUTS BOLTS
WASHERS RIVETS

Signature: [signature] Date: 4/20/89
Countersignature: [signature] Date: 4/20/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 4/20/89

Site Name: EIGHTH STREET SITE TDD: 02-8904-06

Photolog:

Frame/Photo Number	Date	Time	Photographer	Description
1 P20 S20	4/20/89	1505	PAUL BAUER	DIRECTLY IN FRONT OF GATE LOOKING INTO LOT.
1 P21 S21	4/20/89	1510	PAUL BAUER	FROM CORNER OF 8TH AND BRUNSWICK LOOKING SW.
1 P22 S22	4/20/89	1514	PAUL BAUER	FROM 8TH STR LOOKING S.E. AT LOT.

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: Paul Bauer Date: 4/20/89

Countersignature: [signature] Date: 4/20/89

REFERENCE NO. 19

NUS CORPORATION | **TELECON NOTE**

CONTROL NO:	DATE:	TIME:
02-8904-06	4-26-89	1125

DISTRIBUTION: TO FILE - EIGHTH STREET SITE

BETWEEN:	OF:	PHONE:
JOSEPH BECKMEYER CHIEF ENGINEER	JERSEY CITY SEWAGE AUTHORITY	(201) 432-1150

AND: EDMUND KNYFD JR. (NUS)

DISCUSSION:

I asked Joseph if Jersey City was ~~sew~~ EK sewered and he said that it was for all the developed areas. He said that Jersey City is served by a dual sewer system (East and West side). The Eighth Street Site is served by the East side system. Surface water runoff from the site would be transported via the sewer system to a sewage treatment plant approximately 1.5 miles south of the Eighth Street Site, treated and then discharged into the Hudson River. Joseph indicated that during heavy rainstorms the sewer system can become flooded and then surface runoff would be ~~too~~ EK into the Hudson River.

Edmund Knyfd Jr. 4-26-89

ACTION ITEMS:

NUS 087 REVISED 0581

REFERENCE NO. 20

NUS CORPORATION **TELECON NOTE**

CONTROL NO:	DATE:	TIME:
02-8904-06	4/27/89	1600

DISTRIBUTION:

TO FILE - EIGHTH STREET SITE

BETWEEN:	OF:	PHONE:
DAVID BEAMAN	NJDEP - WASTE MANAGEMENT - METRO FIELD OFFICE - W. ORANGE	(201) 669-3960

AND:

EDMUND KNYFD JR. (NUS)

DISCUSSION:

David has worked on this site. The concrete floor in the large building at 383 8th street was torn up and in the process it was discovered that the soil and concrete had contained Chromate. The Chromate was noticed as leaching and crystalizing on the cement floor edges and up some of the wood beams on the building walls. An EPTOX test on the leaching substance verified that Chromate was present. After the concrete floor was broken up, the debris was dumped on the vacant property surrounding the building. The waste was covered with plastic and then later removed.

Edmund Knyfd Jr. 4-27-89

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE NO. 21

NUS CORPORATION | TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8904-06	4-27-89	1645

DISTRIBUTION: TO FILE - EIGHTH STREET SITE

BETWEEN:	OF:	PHONE:
Tom McKEE	NJDEP	(609)633-0701

AND: EDMUND KNYFD JR. (NUS)

DISCUSSION:

Tom also worked on this site and indicated that when the concrete floor and soil were excavated a city inspector recognized the "orangeish" soil as Chromium contaminated. The soil was put into 55 gallon drums and manifested off site. Tom ~~feels~~ said that the chromate processing waste (in the soil) is a residue of chromite ~~ore~~ processing and that chromate is a very mobile substance that can yield chromium. Tom has a file on this site and will send me a copy of it. The site occupies addresses 379, 381 and 383 Eighth Street, Block 417, lots 30, 29 and 28 respectively. The owner is Kaloust "Karl" Yedibalian.

Edmund Knyfd Jr. 4-27-89

ACTION ITEMS:

NUS 067 REVISED 0581

REFERENCE NO. 22

HUDSON COUNTY CHROMIUM SAMPLING PROJECT
PRESAMPLING ASSESSMENT
SITE SPECIFIC INFORMATION

Attach a site specific map showing proposed sampling location(s), and, if necessary, an area sketch map. Also, attach at least two photographs of site.

SITE NAME: Eighth Street #1 aka G.K. Yedibalian Inc. Hardware Shop

Address: 379-381 Eighth Street **Block** 417 **Lot** 30, 29

Town: Jersey City **Project Activity Code:** 9ES

Owner (Name): Carl Yedibalian **Phone #:** 201-656-2377

Owner's Address: 377 Eighth St. Jersey City, NJ

Owner Contacted: Yes **By:** RN/DM **When:** 12/22/87
Site Access Granted: Yes

Split Samples? No **Special Terms?** No

Contact Person (If different from owner):

Phone #:

SOILS:

# of areas of contaminated soil: Pile of soil - see below* **Indicate each known area on map.**

Est. area of contaminated soil:

Depth of contaminated soil (if known):

SPECIAL EQUIPMENT:

SITE DESCRIPTION-(incl. land use, setting, on-going site activities, surrounding land uses, landmarks):

*Warehouse entrance at #383 was filled in with chromium waste, which was discovered as concrete disentegrated. this material was partially excavated and placed on lot at this address (379-381). Aquatech was hired as the consultant. The waste was classified by NJDEP-BHWC as ID #27, and was disposed. sampling was not conducted since remediation was in progress. Currently (as of 4/18/88) a building is being constructed over the vacant lot.

ADDITIONAL INFORMATION:

SITE NUMBER: 77

HUDSON COUNTY CHROMIUM SAMPLING PROJECT
PRESAMPLING ASSESSMENT
SITE SPECIFIC INFORMATION

Attach a site specific map showing proposed sampling location(s), and, if necessary, an area sketch map. Also, attach at least two photographs of site.

SITE NAME: Eighth Street #2

Address: 383 Eighth Street **Block** 417 **Lot** 28

Town: Jersey City **Project Activity Code:** 9ES

Owner (Name): Carl Yedibalian **Phone #:** 201-656-2377

Owner's Address: Modern Village Development Corp., 377 Eighth St., Jersey City, NJ

Owner Contacted: Yes **By:** RN&DM **When:** 12/22/87
Site Access Granted: Yes

Split Samples? No **Special Terms?** No

Contact Person (If different from owner):

Phone #:

SOILS:

# of areas of contaminated soil: **Indicate each known area on map.**

Est. area of contaminated soil: UnKnown

Depth of contaminated soil (if known): UnKnown

SPECIAL EQUIPMENT:

SITE DESCRIPTION (incl. land use, setting, on-going site activities, surrounding land uses, landmarks): Occupied by building on top of CR fill. Supposedly site is sealed and Yedibalian proposes to clean up site.

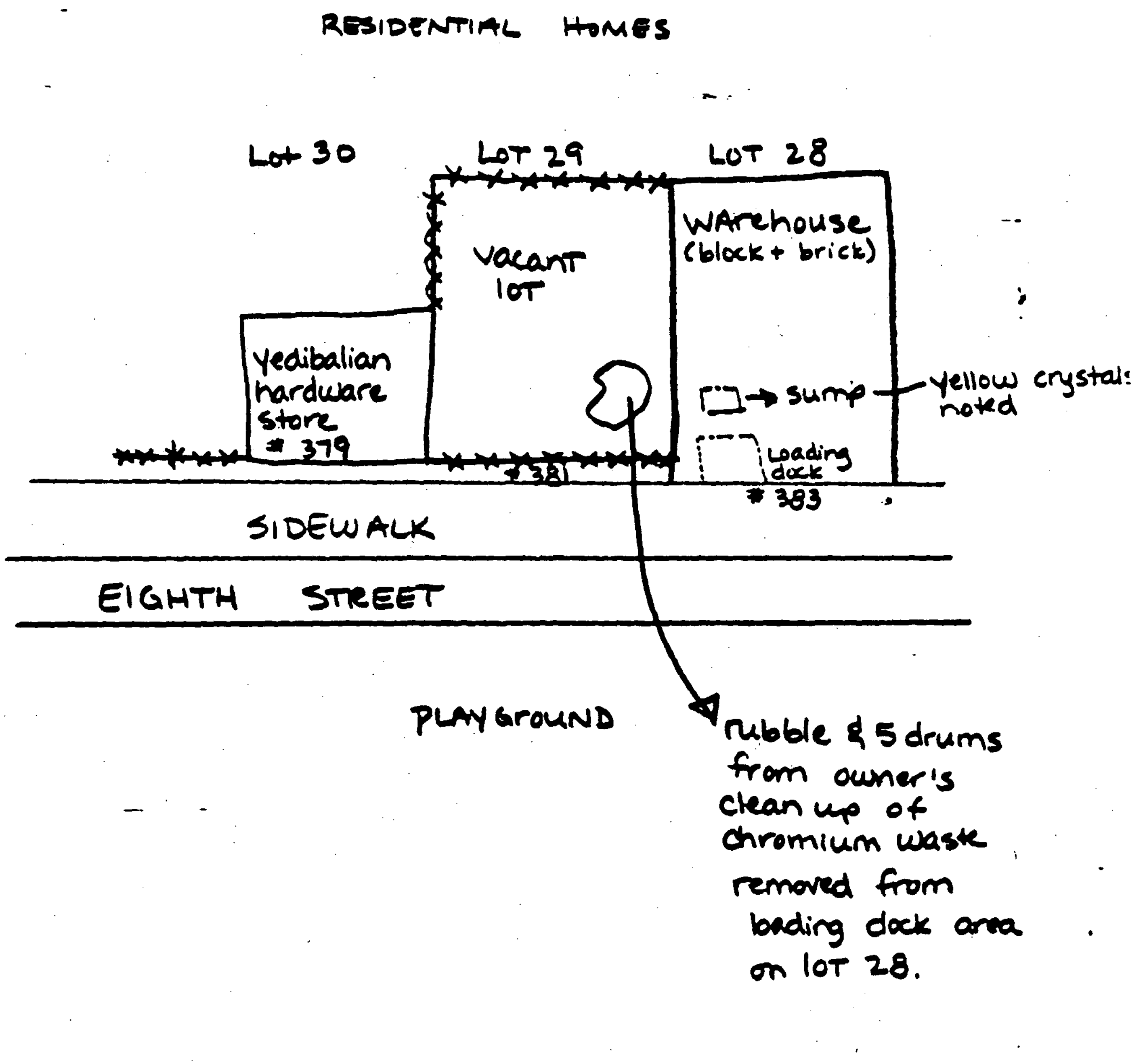
ADDITIONAL INFORMATION: Entrance to warehouse at this address was filled in several years ago with apparently Cr. waste. The soil was, at least, partially excavated and six inches of concrete was poured to seal off this area inside the warehouse. A sample was not obtained due to inaccessibility. See attached for additional information.

EIGHTH STREET #1 + 2

SITES 76 & 77

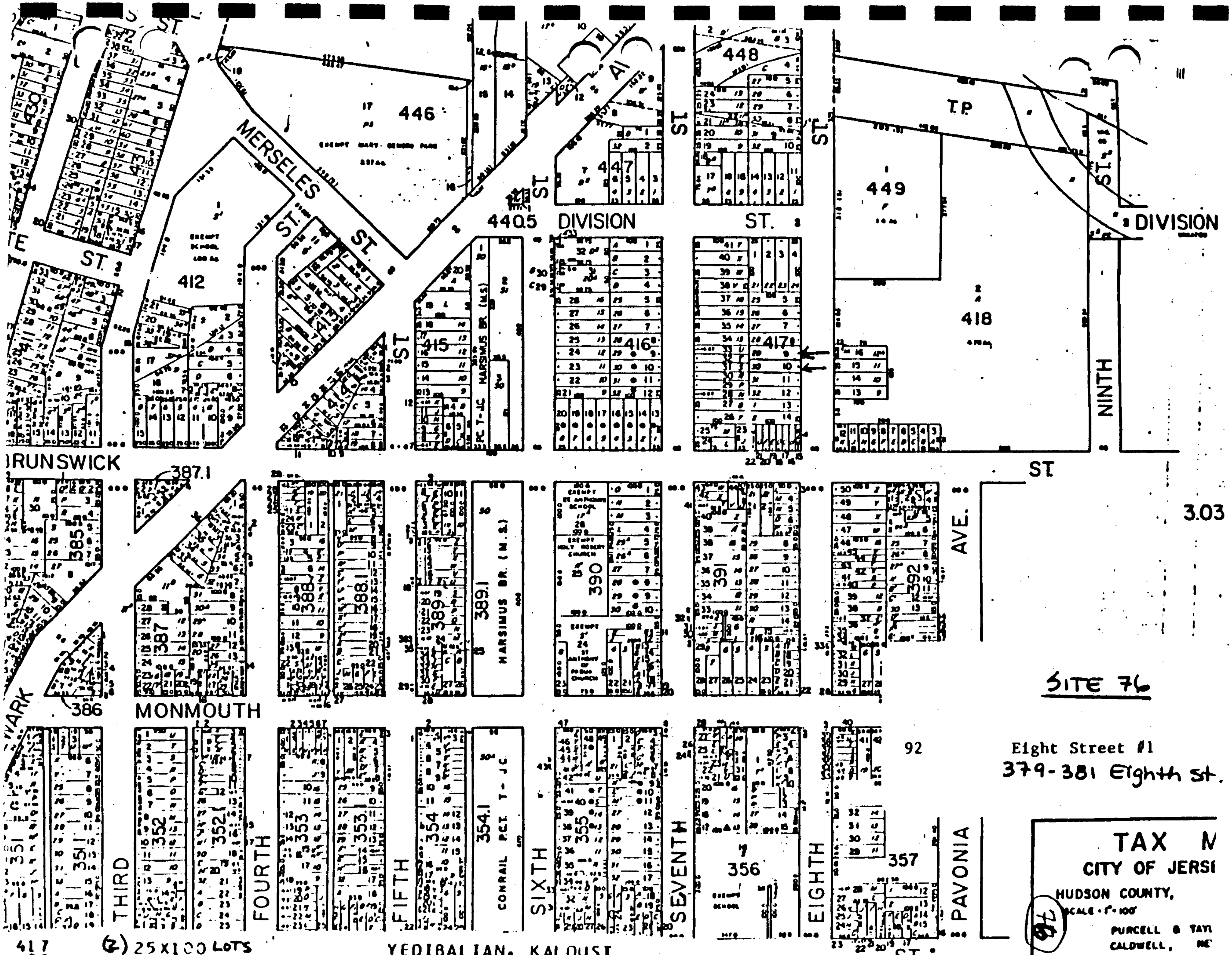
JERSEY CITY

(AKA Yedibalian properties

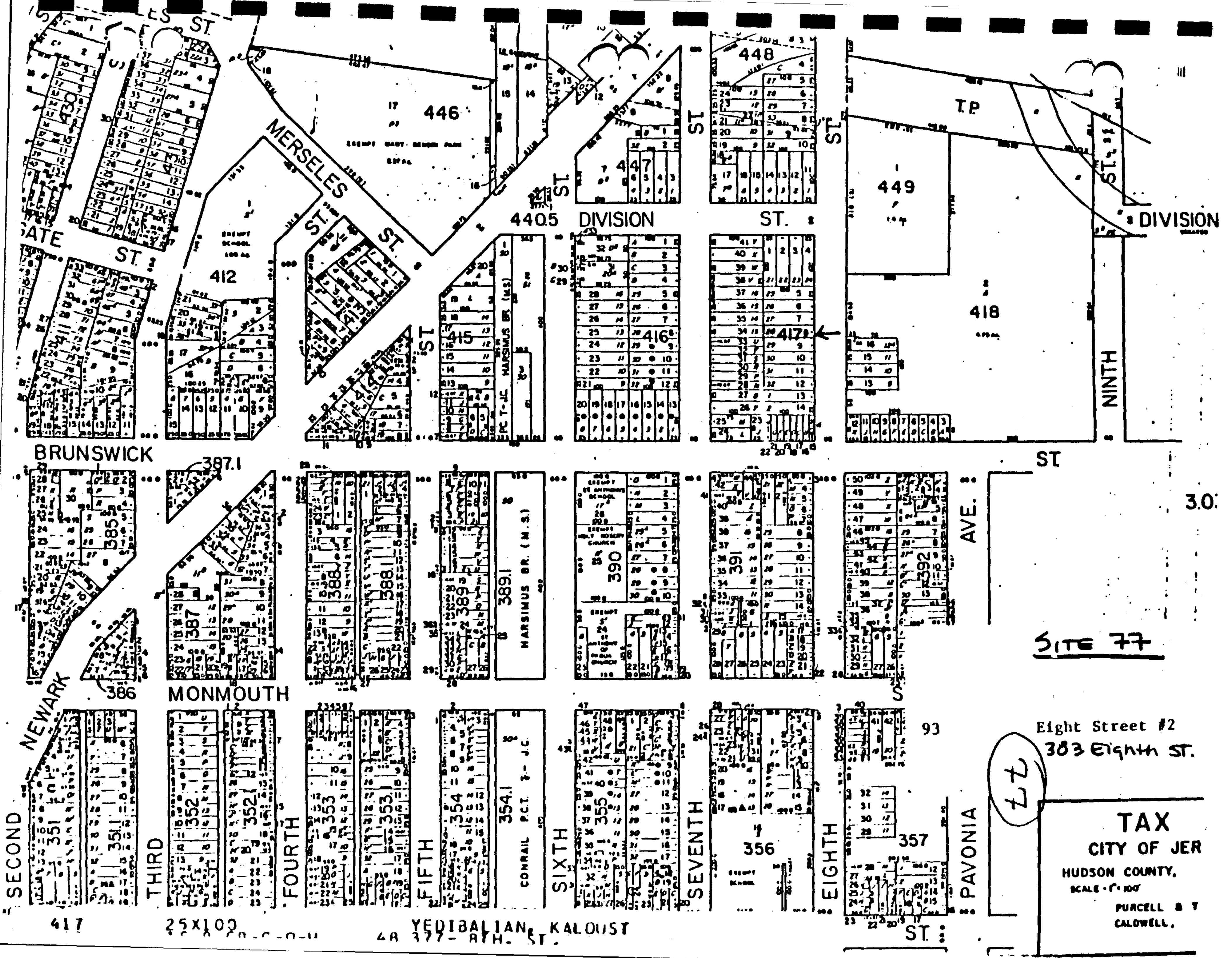


* NOT TO SCALE

DMazur
March 1988



417 (2) 25X100 LOTS YEDIBALIAN, KALOUST



MERSELES ST.
STATE ST.
DIVISION ST.
BRUNSWICK ST.
MONMOUTH
NEWARK
SECOND
THIRD
FOURTH
FIFTH
SIXTH
SEVENTH
EIGHTH
NINTH
PAVONIA
AVE.
T.P.
HARSIMUS BR. (M.S.)
CONRAIL P.C.T. - J.C.
EXEMPT SCHOOL
446
447
448
449
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416
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385
386
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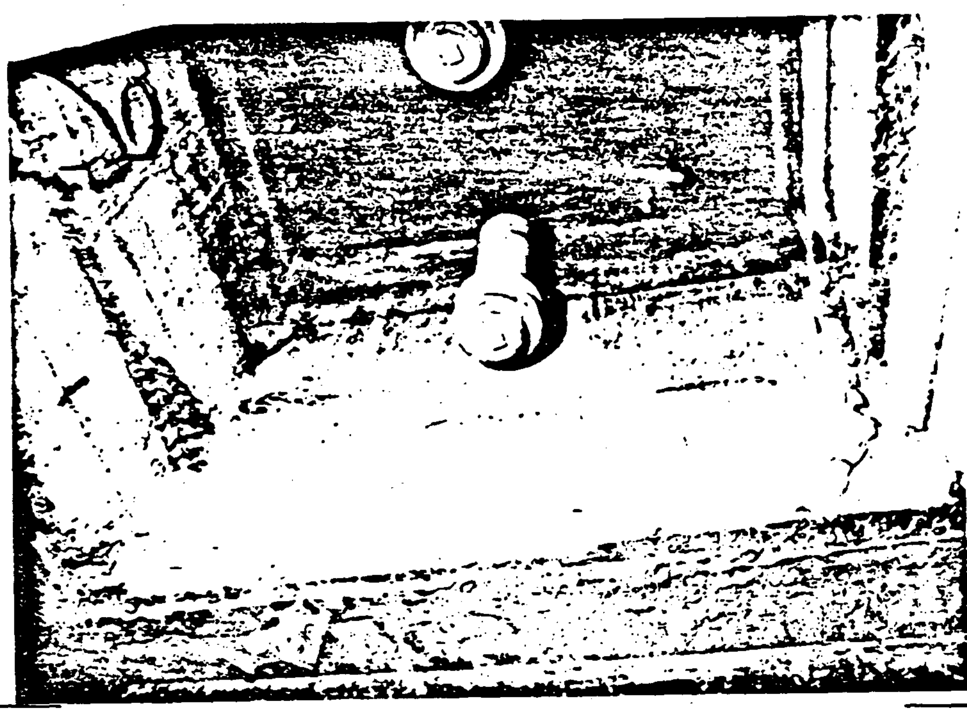
357
93
SITE 77
Eight Street #2
383 Eighth St.
TAX
CITY OF JER
HUDSON COUNTY,
PURCELL & T
CALDWELL,
417
25X100
YEDIBALIAN, KALOUST
48 377- 8TH. ST.

HUDSON COUNTY CHROMIUM STUDY PHOTO LOG

SITE #: 76 & 77 **NAME:** Eighth Street 1 & 2 **DATE:** 12/22/87

FILM #: 6897526-12A **DESCRIPTION:** Overview of these adjacent sites with the same owner and operator. Yellow & red building on right contains the sump illustrated below.



FILM #: 689526-12 **DESCRIPTION:** View of sump inside warehouse at 383 Eighth Street with yellow crystals along sides.

December 16, 1988

RE: Carl Yedibalian
Modern Village Development
377 Eighth Street
Jersey City, NJ 07302 FAX# (201) 656-0566

To: STATE OF New Jersey
Department of Environmental Protection FAX# (609) 633-1454

Dear Mr. Thomas McKee,

As per our conversation today, kindly remove Reference #1 379-381 Eighth Street, Jersey City from the Chromium Waste Sites as it never had the chromium dirt on it. It was just brought from 383 Eighth Street and has now been removed. Enclosed please find the manifests + letters you requested.

Sincerely yours,

Carl Yedibalian, V.P.
Modern Village Development

PLEASE DELIVER ALL 5 COPIES TO:

Mr. Thomas McKee, Section Chief
Bureau of Federal Case Management, NJDEP
(609) 633-0701

Manifest

383 Eighth Street
Jersey City, N J 07302

March 18 1988

U S EPA Region #2
Information Service Center
26 Federal Plaza
New York, N Y 10007

Attention: EPA Hazardous Waste ID Numbers; David Abrines

RE: NJD 982274250

Dear Mr Abrines:

As per my conversation with you and your office, we requested an EPA ID number to remove chromium dirt that was found on our property located at 381 Eighth Street, Jersey City, N J. This was a one time only removal. The dirt has been removed and the copy of the manifest is enclosed.

As per our conversation, we are requesting to be reclassified as we no longer need the ID number. We were an innocent third party who purchased the property and later we unearthed the chromium dirt.

Sincerely yours,

Carl Yedibalian

Carl Yedibalian, Vice President
Modern Village Development Corp

enc

383 Eighth Street
Jersey City, N J 07302

March 18 1988

City Hall
280 Grove Street
Jersey City, N J 07302

Attention: John McDonald

Dear Mr McDonald:

As per our phone conversation, we have disposed of the chromium dirt, according to your direction, that was on our property at 381 Eighth Street, Jersey City, N J.

Enclosed please find a copy of the manifest which you requested that reflects the removal of the dirt.

Sincerely,

Carl Yedibalian

Carl Yedibalian, Vice President
Modern Village Development Corp

enc.

NJHW-001 (REV. 9/88)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. / Manifest Document No. NJD982274250 03230	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: MODERN VILLAGE DEVELOPMENT
381 8th Street
Jersey City, N.J. 07032

4. Generator's Phone (201) 656-2377

A. State Manifest Document Number: NJA

B. State Generator's ID: SAME

5. Transporter 1 Company Name: S & W WASTE, INC.
6. US EPA ID Number: NJD991291105

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address:
S & W WASTE, INC.
105 Jacobus Avenue
South Kearny, NJ 07032

10. US EPA ID Number: NJD991291105

	HM	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a.	X	HAZARDOUS WASTE SOLID NOS ORME NA 9189 RQ (D007)	001	CM	15	Yds Y
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above:
E/S- Soil 99%
Chromuim 1%

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

S & W APPROVAL NO. 000220-057

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year
[illegible]	[illegible]	[illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
[illegible]	[illegible]	[illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year

EPA Form 8700-22 (Rev. 9-86) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

8 — GENERATOR COPY

DEC 16 '88 14:43 G.K. YEDIBALIAN, INC. - NEW JERSEY PAGE # 5/5

115 JACOBUS AVE.
SOUTH KEARNY
NJ 07032
TEL NO. (201) 344-4004

NUMBER 5625

CUSTOMER	[illegible]	JOB SITE	[illegible]
CUSTOMER	[illegible]		[illegible]
CONTACT	[illegible]		[illegible]
PHONE	[illegible]	EPA ID	[illegible]

TRAILER
IN
OUT
MANIFEST
NUMBER OF (CIRCLE ONE) DRUMS/GALS/YARDS

☐ PULL/REPLACE ☐ PUMP TANK
☒ DELIVER/WAIT & PULL ☐ PUMP DRUMS

OTHER
PURCHASE ORDER #

TO PROVIDE	YES	NO	#	S&W TO PROVIDE	YES	NO	#	S&W TO PROVIDE	YES	NO	#
	✓			LINER	✓			LIFT		✓	
TEST		✓		MT. DRUM		✓		XTRA HOSE		✓	
LABEL		✓		OVERPACK		✓		HELPER		✓	

GROSS WEIGHT
TARE WEIGHT
NET WEIGHT

ARRIVED AT CUST. — DEPARTED CUST. — ARRIVED AT ...
AM/PM TIME — AM/PM TIME — AM/PM TIME

REQ. E.T.A. A M ☐ AM ☐ PM
POS. E.T.A. ☐ AM ☐ PM

NO. AND TYPES CONT.	WASTE DESCRIPTION	APP. #	PRC. #		NO. AND TYPES CONT.	WASTE DESCRIPTION
[illegible]	[illegible] NAV / ... 0007	0?7		III		
				IV		

COMMENTS:
D... [illegible]

THE UNDERSIGNED AGREES THAT THE ABOVE SERVICE INFORMATION IS CORRECT.
CUSTOMER SIGNATURE PRINTED NAME DATE

115 JACOBUS AVENUE
SOUTH KEARNY, NJ
(201) 344-4004

TICKET # 041569

DATE	TRUCK #	DRIVER	MANIFEST #
2/26/88	916	[illegible]	

BILL TO: Accutech

CONTAINER: 8915
IN:
OUT:
DRUMS REMOVED

INSTRUCTIONS/REMARKS: Deliver (1) OT 15 yd. Lined, Sealed + Manifested

TIME LEFT YARD 8:00
TIME ARRIVED JOB 8:30
TIME LEFT JOB 7:40
TIME ARRIVED YARD

CUSTOMER SIGNATURE Carl Bel...

REFERENCE NO. 23

Telephone 201/591-0892

SITE 76+77

AGUILAR ASSOCIATES & CONSULTANTS, INC.

281 Highway 79
Morganville, New Jersey 07751

REPORT OF AIR SAMPLING ACTIVITIES

performed at

MODERN VILLAGE DEVELOPMENT CORPORATION PROPERTY

383 8th Street
Jersey City, NJ 07302

Prepared by

AGUILAR ASSOCIATES & CONSULTANTS, INC.

281 Highway 79
Morganville, NJ 07751

SITE 76+77

INTRODUCTION

In March 1987, the Modern Village Development Corporation (MVDC) replaced the existing concrete floor within their warehouse facility located at 383 8th Street, Jersey City, NJ. During the resulting inspection of the facility by Mr. Earl Z. Tex Aldredge of the Jersey City Health Division (JCHD), Mr. Aldredge expressed concerns about the possibility of chromium contamination in the soil underneath the facility. To ensure the health and welfare of employees, Mr. Aldredge requested that measures be taken to prevent employee exposure until an air sampling program could be implemented.

On 15 April 1987, MVDC requested that Aguilar Associates & Consultants, Inc. (AA&C) prepare and implement a sampling plan for air quality monitoring within their newly renovated 2300 square foot facility. The Sampling Plan was approved by Mr. Aldredge on 7 July 1987, and implemented by AA&C on 10 July 1987.

SITE 74-77

SITE HISTORY

The MVDC warehouse facility in Jersey City was originally constructed on a site which was suspected of containing chromium contaminated fill material. During the replacement of the concrete floor in the warehouse, it was noted that some parts of the original slab had yellow staining on the underside. Due to the staining, the concrete debris was removed from the building and placed on MVDC's adjacent vacant lot and covered with plastic sheeting to await waste classification and disposal.

The new concrete floor was constructed and Mr. Aldredge of the JCHD inspected the facility. At the time of inspection, the concrete block walls within the facility were stained with various colored materials and showed some evidence of crystal growth. At that time, Mr. Aldredge requested that employees don dust masks while working within the building and that a Sampling Plan be developed to determine the presence of chromium particulates within the facility. Additionally, Mr. Aldredge requested that the crystalline material be removed and a sealing material sprayed on the walls to prevent further "wicking" of contaminants from the soil underneath the floor.

On 24 April 1987, AA&C submitted a proposed Air Sampling Plan, and, on 15 June 1987, submitted a Foundation Sealing Plan (please refer to Appendix I). The Plans were submitted to Mr. Aldredge for his review and comment.

On 7 July 1987, a meeting was held at City Hall in Jersey City between Mr.

Aldredge, Mr. Karl Yedibalian (MVDC), Mr. Gary Danis (MVDC Attorney), Mr. Harry Moscatello (Accutech Environnmental Services, Inc., disposal consultant), Mr. Cesar Aguilar (AA&C), and Ms. Lynne Shawyer (AA&C) to discuss the Sampling Plan, the sealing of the walls, and the eventual disposal of construction debris. At that time, it was agreed to implement the Sampling Plan on 10 July 1987, and seal the walls after the results of analysis were available (completed on 24 July 1987). Additionally, Mr. Moscatello was to proceed with the waste classification for disposal.

The following section details the events on 10 July 1987 during the actual air sampling.

SITE 76 + 77

SITE ACTIVITIES - 10 JULY 1987

Upon arrival at the facility, three (3) locations were chosen for the placement of high volume air sampling pumps and filters (please refer to the sketch in Appendix II). Locations were chosen relative to the amount of personnel traffic in each area of the facility. Normal work activities were carried on by all employees throughout the course of the day.

The first pump (with backup) was placed in the office area, Location A, at a height of 5'. Pump 17 and filter 1, and backup pump 18 and filter 2 were set in place. Filter cartridge caps remained in place until sampling commenced.

The second pump (with backup) was placed near the back of the warehouse area, Location B, at a height of 5'. This area was chosen for a representation of the proposed stock area. Pump 25 and filter 3, and backup pump 29 and filter 4 were set in place. Filter cartridge caps remained in place until sampling commenced.

The third pump (with backup) was placed near the front of the warehouse area, Location C, at a height of 5'. This area was chosen for a representation of the proposed shipping area. Pump 35 and filter 5, and backup pump 39 and filter 6 were set in place. Filter cartridge caps remained in place until sampling commenced.

One filter cartridge was retained and carried throughout the day as a field lank to ensure filter cartridge QA/QC.

SITE 76 + 77

During initial setup, the pump and filter numbers were recorded in the Log Book, and the laboratory calibrations noted. Additional filter cartridges were prepared and held in a secure area in the event that any of the active filters become saturated.

After placement and initial logging was complete, filter caps were removed and pumps started. Start times were logged for each pump. Pump status and flow rate was checked every hour and noted in the log (please refer to the chart provided on the following page). Monitoring was performed for both the primary and backup pumps. As evidenced by the log, none of the filters was suspected of saturation at any time.

Upon completion of the eight hour sampling, each pump was disengaged, the filter cartridge removed from the pump, and both filter caps replaced. The filter cartridges were then placed in Ziploc bags for storage during transport. A Chain of Custody form was prepared (please refer to Appendix III) and placed with the filters in a case with the pumps. The case was then locked and remained in the custody of the sampler until transfer for transport to the laboratory.

SITE 76 + 77

NAC Northeastern Analytical Corp.

234 Route 70 Medford, NJ 08055
609 654-1441

Client: Aquilar Associates and Consultants

Address: 281 Hwy 79
Morganville, NJ 07751

Date: 7-15-87

Test Report No.: NAC5554

Date Sampled: 7-14-87

Sampled by: CLIENT

Number of Samples: 7

I. Analytical Results

	Sample Designation			
Parameter	NAC5554-1 #1 Pump #17	NAC5554-3 #3 Pump #25	NAC5554-5 #5 Pump #35	NAC5554-7 Blank
Chromium, total	<0.5	<0.5	<0.5	<0.5
Chromium, total, ug/m^3 *	<0.6	<0.6	<0.6	--

* Sampling data provided by the client.

Samples NAC5554-2, 4 and 6 were not analyzed, at the request of the client.

II. Quality Assurance Data

Spiked Sample	Amount of Spike, ug	% Recovery
Control	10	91

If you have any questions concerning this analyses, please do not hesitate to contact your account representative.

Respectfully submitted,

Northeastern Analytical Corp.

John Rissel
Laboratory Manager

JR/md

Attachment: Chain of Custody (3)

REFERENCE NO. 24

Hackensack River Symposium II
Sept. 13, 1988 F.D.U. Teaneck

FISHES OF THE LOWER HACKENSACK RIVER

A. BRETT BRAGIN

Hackensack Meadowlands Development Commission
One DeKorte Park Plaza
Lyndhurst, New Jersey 07071

INTRODUCTION

The Hackensack River originates in the Palisades near Haverstraw, New York and flows approximately south for some 50 miles to its mouth at Newark Bay (Kassner, 1971). In 1922 a 2.85 billion gallon reservoir was formed by a dam built above the head of tide at Oradell. This effectively separated the river into a controlled, freshwater area above, and an estuarine, brackish area below the dam (McCormick and Associates, 1977). The tidal portion of the river, from its confluence with Newark Bay to New Milford, New Jersey reaches some 22.5 miles and flows through heavily industrialized and populated Bergen and Hudson counties.

The Oradell Dam has severely restricted freshwater flow into the Hackensack River. At this time approximately 50% of the freshwater input is derived from precipitation, while treated sewage discharges account for approximately 30%, and the remainder is derived from the release of water held in the Oradell reservoir (Cheng and Konsevick, 1988). Three hundred years ago this system was a freshwater white cedar (*Chamaecyparis thyoides*) bog, but repeated attempts to drain the marshes by ditches and dikes, using the wetlands as a repository for solid waste, and municipal and industrial discharges have resulted in the present condition of the river and its surrounding wetlands (Kraus and Smith, 1988).

In order to improve the fishery resource knowledge of this estuary, the Hackensack Meadowlands Development Commission began collecting water quality and fisheries data in February 1987. Twenty one sampling sites were selected, based on habitat diversity and compatibility with fishing gear (Figure 1).

MATERIALS AND METHODS

Four different gear types were used. A 16 foot otter trawl (3/4 inch square body mesh, 5/8 inch square cod-end mesh, 1/4 inch mesh cod-end liner) was towed for 3 minutes at 2300 r.p.m. at 9 sites, with 2 repetitions per site. A 20 foot commercial Privateer with a 120 h.p. outboard motor was used for towing. Trawls were towed unbridled with 5/8 inch polydacron rope fastened to the transom of the vessel, and deployed with the vessel in forward motion, with tension on the tow ropes and against the prevailing surface current. A minimum 5:1 ratio of tow rope length to station depth was maintained. The net was retrieved by hand.

A 60 foot long by 6 foot high by 1/4 inch bag seine was used at 3 sites. The seine was walked through the water in a semi-circular pattern against the shoreline.

A 200 foot long by 8 foot high experimental sinking gill net consisting of four 50 foot panels of 3/4 inch, 1 3/4 inch, 3 1/2 inch, and 4 inch square mesh was used at 3 sites. It was deployed with cinder blocks attached to both leadlines and two bouys attached to the blocks for marking. Sets were fished for approximately 24 hours.

The "lower" and "middle" zones of the river proved similar in terms of the number of species and fish groups found. The salinities here are in the mesohaline range (18.0 to 5.0 0/00). The "upper" zone differs from the others in terms of number and groups of fish species, as well as salinity. Salinity here is oligohaline (5.0 to 0.5 0/00). In general the mesohaline zone exists from River Mile (RM) 0-10 (the mouth of the river to Cromakill Creek), the oligohaline zone from RM 10-16 (Cromakill Creek to just upriver of Hackensack) and the tidal freshwater zone from RM 16 to Oradell Dam. The freshwater segment is the longest generally during winter and spring, due to rain, snow and ice melt, and it shrinks in summer and autumn, during periods of low freshwater input and increased evaporation. As the freshwater segment shrinks, the meso- and oligohaline segments expand upstream, at times upriver to the dam (P.S.E.&G., 1988). Further upstream, outside of the Hackensack Meadowlands District, we would have encountered an increasingly freshwater system and fish community.

CONCLUSIONS

The Hackensack River and its associated wetlands have been greatly impacted by man. Construction of a dam at Oradell has greatly altered the original river hydrology, and consequently it no longer functions as a "normal" estuarine river. It is now essentially a canal, open fully only at the end adjacent to Newark Bay. Although the river is not fishable due to restrictions imposed by the New Jersey Department of Environmental Protection, this estuary is a refuge and nursery area for several important commercial and recreational species, such as striped bass, Atlantic menhaden, weakfish, winter flounder, alewife, and blueback herring, and for two species listed threatened by the State of New Jersey, the Atlantic tomcod and American shad. Contrary to the misconception that the Hackensack River is "dead", our data show that the river is very much alive and supports moderately diverse fish and invertebrate communities.

LITERATURE CITED

Cheng, C. and E. Konsevick. 1988. Trends in the water quality of an urban estuary: Hackensack Meadowlands, N.J. Proceedings of the Symposium on Coastal Water Resources. AWRA, TPS-88-1: 147-154.

Kasner, J. J. and Co. 1971. Feasibility report, water pollution control systems in connection with the development of the Hackensack Meadowlands, Bergen and Hudson counties. Prepared for State of New Jersey, Hackensack Meadowlands Development Commission. 148pp.

Kraus, M.L. and D.J. Smith. 1988. Competition and succession in a perturbed urban estuary: the effects of hydrology. Proceedings of the National Wetland Symposium: Mitigation of Impacts and Losses, ASWM Technical Report 3: 325-327.

McCormick, J., and Associates. 1977. Draft Assessment of the potential environmental impact of the construction and operation of a New Jersey sports and exposition complex at a site in East Rutherford, Bergen County, New Jersey. 91pp.

P.S.E.&G. 1988. Hudson Generating Station Units 1 & 2 and Kearny Generating Station Units 7 & 8, Supplemental 316(a) Demonstration. Newark, N.J. 30 April, 1988. 179pp.

REFERENCE NO. 25

NUS CORPORATION		TELECON NOTE
CONTROL NO: 02-8904-06	DATE: 5-18-89	TIME: 1055
DISTRIBUTION: TO FILE - EIGHTH STREET SITE		
BETWEEN: BOB LORFINK PRINCIPAL ENGINEER	OF: JERSEY CITY WATER DEPT.	PHONE: (201) 547-4414
AND: EDMUND KNYFD JR. (NUS)		

DISCUSSION:

I asked Bob about the uses of surface water in the Jersey City area. He believed that the poor water quality and high Chloride content restricted the local surface water uses. The Hudson River is used for commercial shipping and some secondary contact recreation such as boating. The upper Newark Bay is used for commercial shipping. In this area the Hackensack River is generally unused. He felt no surface water in this area is suitable for drinking water.

Edmund Knyfd Jr. 5-18-89

ACTION ITEMS:

REFERENCE NO. 26

WATER QUALITY REGULATIONS

SURFACE WATER AND GROUNDWATER CLASSIFICATIONS AND STANDARDS

New York State
Codes, Rules and Regulations
Title 6, Chapter X
Parts 700-705

New York State Department of Environmental Conservation

To meet the water quality objectives referred to in the "Great Lakes Water Quality Agreement of 1972," the standards listed above shall be subject to revision from time to time after further hearings on due notice.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 25, 1974; amds. filed: Sept. 20, 1974; July 3, 1985 eff. 30 days after filing.

702.2 Class AA – Special (Lake Champlain drainage basin).

CLASS AA – SPECIAL

Best usage of waters. Any usage except for disposal of sewage, industrial wastes or other wastes.

Quality Standards for Class AA – Special Waters (Lake Champlain drainage basin)

	Items	*Specifications*
1.	Floating solids, settleable solids; oil; sludge deposits; toxic wastes; deleterious substances; colored or other wastes or heated liquids.	None attributable to sewage, industrial waste or other wastes.
2.	Sewage or waste effluents.	None into waters of this class.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 25, 1974 eff. 30 days after filing; provided, however, if the application, pursuant to Parts 800 to 941, inclusive, of Title 6, of any provision of Part 701 or 702 shall be found to be invalid, the corresponding provision of Part 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

702.3 Special classes and standards for the Lower Hudson River, Arthur Kill, Kill Van Kull, Harlem River, Raritan Bay and Lower East River drainage basins, New York Bay area, Nassau County, including Long Island Sound, Suffolk County, Upper East River, Long Island Sound drainage basins within Queens, Bronx and Westchester Counties, and Jamaica Bay drainage basin within Kings and Queens Counties, including a certain portion of Rockaway Inlet. (a) This section applies to the waters within the following areas, which constitute the Interstate Sanitation District:

(1) the drainage basin of the Lower Hudson River, from the mouth to northern Westchester-Rockland county lines, except Saw Mill River and Sparkill Creek drainage basins;

(2) the drainage basins of Arthur Kill, Kill Van Kull, Harlem River and Raritan Bay;

(3) the drainage basin of Lower East River, from the mouth to a line across East River north of Wards Island between Stony Point in Bronx County and Lawrence Point in Queens County;

(4) New York Bay, including Gravesend Bay, Coney Island Creek, Atlantic Basin, Erie Basin, Gowanus Bay, Gowanus Canal, The Narrows and Atlantic Ocean waters off Coney Island lying westerly of a north-south line from Light Inlet at the southeasterly tip of Coney Island Peninsula to the south tip of Rockaway Point, thence along the jetty to Rockaway jetty light, thence due south to the New York - New Jersey boundary line;

(5) Nassau County, including the waters of Long Island Sound between Nassau-Queens and Nassau-Suffolk county lines, and the waters of Atlantic Ocean to the three-mile limit between said county lines;

(6) the area within Suffolk County lying west of a north-south topographical limit line and its extensions, to a point in Long Island Sound at the New York - Connecticut state boundary line due north of Miller Place Beach and to Blue Point on the south mainland, thence southward across Great South Bay to Water Island, thence three miles due south to a point in the Atlantic Ocean at the south state boundary line;

(7) certain tidal waters which are within the Upper East River and Long Island Sound drainage basins within Queens, Bronx and Westchester Counties; and

(8) Jamaica Bay drainage basin within Kings and Queens Counties, and including Rockaway Inlet, east of a north-south line drawn from Light Inlet at the southeasterly tip of Coney Island Peninsula near Manhattan Beach to the westerly shoreline west of lookout tower on Rockaway Point.

(b) Said classes and standards of quality and purity applicable thereto are set forth hereinafter and designated Class I and Class II.

CLASS "I"

Best usage of waters. The waters shall be suitable for secondary contact recreation and any other usage except for primary contact recreation and shellfishing for market purposes.

Quality Standards for Class "I" Waters

Items	*Specifications*
1. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the marine district as defined by Environmental Conservation Law (§ 17-0105).
2. Coliform.	The monthly geometric mean total coliform value for 100 ml of sample shall not exceed 10,000, and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 2,000 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
3. Dissolved oxygen.	Shall not be less than 4.0 mg/l at any time.
4. pH.	The normal range shall not be extended by more than one-tenth (0.1) pH unit.
5. Turbidity.	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
6. Color.	None from man-made sources that will be detrimental to anticipated best usage of waters.

Items

7. Taste and odor-proc stances, toxic waste terious substances.

8. Suspended, colloida solids.

9. Oil and floating sub:

10. Thermal discharge:

Sec. amd. filed Ma filed: Sept. 20, 1974; S

702.4 Class AA – Sp

Best usage of waters. other waste.

Qua

Items

1. Floating solids, settl oil, sludge deposits, t deleterious substanc other wastes or heat

2. Sewage or waste effl

Sec. amd. filed Ma 25, 1974 eff. 30 days a 800 to 941, inclusive, invalid, the correspo such effective date s until such time as th lawfully be made ap

REFERENCE NO. 27

0037-B
02-8412-23/NJI6

26-23-326

Form 87-5M-8-51

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
Division of Water Policy & Supply

WELL RECORD

Permit No. 26-581
Application No. ______
County ______

1. OWNER Kenmore Metals Corp. ADDRESS 380 Ninth Street, Jersey City, N.J.
   Owner's Well No. Test Well SURFACE ELEVATION ______ Feet (Above mean sea level)
2. LOCATION Same as above.
3. DATE COMPLETED 12/9/52 DRILLER Artesian Well & Equipment Co., Inc.
4. DIAMETER: Top 8 Inches Bottom 8 Inches TOTAL DEPTH 99 Feet
5. CASING: Type Steel Diameter 6 Inches Length 99 Feet
6. SCREEN: Type ______ Size of Opening ______ Diameter ______ Inches Length ______ Feet
   Range in Depth { Top ______ Feet / Bottom ______ Feet } Geologic Formation ______
   Tail piece. Diameter ______ Inches Length ______ Feet
7. WELL FLOWS NATURALLY ______ Gallons per Minute at ______ Feet above surface
   Water rises to ______ Feet above surface
8. RECORD OF TEST: Date ______ Yield ______ Gallons per minute
   Static water level before pumping ______ Feet below surface
   Pumping level ______ feet below surface after ______ hours pumping
   Drawdown ______ Feet Specific Capacity ______ Gals. per min. per ft. of drawdown
   How Pumped ______ How measured ______
   Observed effect on nearby wells ______
9. PERMANENT PUMPING EQUIPMENT:
   Type ______ Capacity ______ Gallons per minute
   How Driven ______ Horse Power ______ R.P.M. ______
   Depth of pump in well ______ Feet Depth of Foot piece in well ______ Feet
   Depth of Air Line in well ______ Feet Type of Meter on Pump ______
10. USED FOR ______ AMOUNT { Average ______ Gallons Daily / Maximum ______ Gallons Daily }
11. QUALITY OF WATER ______ Sample: Yes ______ No. ______
    Taste ______ Odor ______ Color ______ Temperature ______ °F
12. LOG See Reverse Side. Are samples available? ______
    (Give details on back of sheet or on separate sheet)
13. SOURCE OF DATA ARTESIAN WELL & EQUIPMENT CO., INC.
14. DATA OBTAINED BY ARTESIAN WELL & EQUIPMENT CO. DATE [redacted] 16, 1952

(Note: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

LOG OF FORMATION

0 - 2' Concrete, sand, fill.

2 - 63' Gray clay, soft.

63 - 64' Large and small gravel.

64 - 65' Gray clay, boulders.

65 - 90' Red and gray clay, silty.

90 - 92' Gray clay, some sand and fine gravel.

92 - 95' Sand, some small gravel, clay.

95 - 99' Trap rock.

REFERENCE NO. 28

APPRAISAL OF WATER RESOURCES IN THE HACKENSACK RIVER BASIN, NEW JERSEY

By L. D. Carswell

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations 76-74

Prepared in cooperation with
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL
PROTECTION, DIVISION OF WATER RESOURCES

June 1976

GEOLOGY

General Features

During the Late Triassic Epoch downfaulting produced a series of northeastward-trending basins in the Piedmont Plateau from North Carolina to Nova Scotia. Sedimentary and associated igneous rocks of Triassic age occupy the downfaulted basins and are known as the Newark Group. In New Jersey the Newark Group crops out in a band 16 to 30 miles wide trending southwestward from the Hudson River to the Delaware River (fig. 1). In the vicinity of the Delaware River the Newark Group is about 12,000 feet thick (Johnson and McLaughlin, 1957, p. 32). The bedrock in the Hackensack River basin is a part of the Newark Group of Late Triassic age.

The sedimentary rocks of the Newark Group in New Jersey are composed of reddish brown arkosic sandstone, mudstone, siltstone, and conglomerate, and dark-gray argillite. The sediments were derived largely from rocks of Paleozoic and Precambrian age to the southeast and were deposited in a nonmarine intermontane basin (Van Houten, 1965). In Triassic time the sedimentary rocks were intruded by diabase sills (intrusions which parallel the enclosing beds) and dikes (intrusions which cut across the bedding). The diabase is more resistant to erosion than other rocks of the Newark Group and generally forms ridges such as the Palisades.

The Newark Group has been divided into three formations on the basis of distinctive lithology: a lower unit, the Stockton Formation; a middle unit, the Lockatong Formation; and an upper unit, the Brunswick Formation. The Lockatong interfingers with both the underlying Stockton and overlying Brunswick; its presence has been reported at only one locality in the Hackensack River basin (Van Houten, 1964, p. 500). The distribution of the units of the Newark Group in the Hackensack River basin is shown in figure 3.

The beds of the Newark Group generally strike north to northeast in the Hackensack River basin and dip west to northwest at approximately 10 degrees. A prominent set of steeply dipping joints parallels the strike of the beds. A less prominent set of nearly-vertical joints parallels approximately the direction of dip of the beds. In the cliffs along the Hudson River the diabase has well developed columnar jointing which inspired the name "Palisades" for the vertical columns of rock. The faults that cut and displace the Triassic rocks typically strike northeastward and are parallel to or intersect the strike of the beds at a low angle.

Surficial deposits cover most of the bedrock in the Hackensack River basin and are largely a result of several major advances of the continental glaciers across the area during the Pleistocene Epoch. Younger deposits of Holocene age, consisting largely of alluvium deposited by present-day streams, overlie the glacial deposits. The alluvium is restricted to the flood plains of the streams.

Lockatong Formation

The Lockatong Formation has been identified at only one location, North Bergen, in the Hackensack River basin. Here it consists of argillite that has been altered to hornsfels during the emplacement of the adjacent diabase sill (Van Houten, 1964, p. 500).

The Lockatong overlies the Stockton Formation and is overlain by the Brunswick Formation. Laterally it intertongues with both the Brunswick and the Stockton Formations.

The Lockatong Formation is composed of cyclic units of chemical and detrital origin that average 15 feet in thickness. The detrital deposits are mudstones composed of abundant sodium feldspar, calcite, illite, and chlorite with very little quartz and potassium feldspar. In the chemical deposits the mudstone contains abundant analcime, albite, dolomite, calcite, illite, and chlorite. Dolomite and analcime casts of skeletal glauberite (and possibly anhydrite) crystals are common in some of the chemical deposits (Van Houten, 1965).

The formation is 90 feet thick at North Bergen. It thins northward and is entirely missing at the New York-New Jersey State line. It presumably thickens south of North Bergen and is 3,750 feet thick in western New Jersey and adjacent Pennsylvania.

Brunswick Formation

The Brunswick Formation overlies the Stockton Formation and forms the bedrock throughout most of the Hackensack River basin. It is reddish-brown and composed of mudstone, siltstone, sandstone, and conglomerate. In the southern part of the basin mudstone is the dominant lithology. The deposits gradually become coarser grained northward (Kümmel 1898, p. 43 and Savage, 1968) so that in the northern part of the basin in New York the Brunswick consists largely of sandstone and commonly contains beds of conglomerate.

Gypsum and glauberite are reported to occur in the Brunswick Formation. Herpers and Barksdale (1951, p. 37) have reported the presence of gypsum from well borings in the Newark area just south of the Hackensack River basin. Glauberite has long been known to be present locally in the Brunswick Formation. Van Houten (1965, p. 834) reports that some beds enclose large complete molds of glauberite, as well as rosettes of elongate calcite casts. The coarser deposits are fledspathic and are commonly cemented by calcite (Van Houten, 1965, p. 834).

The thickness of the Brunswick Formation in the Hackensack River basin is unknown. Herpers and Barksdale (1951, p. 23) estimated the Brunswick to be about 6,000 to 7,000 feet thick in the Newark area just south of the Hackensack River basin.

Diabase

Sills and dikes of diabase (commonly called traprock) intruded the strata of the Newark Group. They are relatively resistant to erosion and form the Palisades ridge, Laurel Hill, and Little Snake Hill. Minor intrusive bodies of diabase are found at North Arlington and Bogota. The diabase dikes at Laurel Hill, Little Snake Hill, and Bogota cut the Brunswick Formation at high angles. The diabase at North Arlington is a sill, and that which forms the Palisades is a semiconcordant sill. The latter sill was fed by dikes and the upper and lower contacts of the sill locally cut across the bedding of the Stockton Formation. The Palisades diabase is 1,200 feet thick north of Englewood and thins southward to Jersey City (Darton, in Merrill and others, 1902, p. 9).

Diabase is a black, hard, dense rock composed of about equal amounts of plagioclase fledspar and augite. The texture ranges from finely crystalline in small dikes or chilled border zones of large intrusions to coarsely crystalline in the center of large intrusions where the rock solidified slowly thus giving the crystals a longer time to grow. Diabase is extensively quarried for road metal, particularly the dike at Laurel Hill and along the west flank of the ridge formed by the Palisades sill.

Quaternary Deposits

Pleistocene Deposits

Unconsolidated deposits overlying the Newark Group consist of sand, gravel, silt, and clay, that were deposited largely during the last (Wisconsin) glaciation of the Pleistocene Epoch. These deposits are generally thickest in the valleys and are thin or absent on hill crests. The deposits can be broadly subdivided into till and stratified drift. Till is an unsorted mixture of sand, gravel, silt, and clay deposited directly from the ice. It covers almost all the bedrock in the Hackensack River basin. The thickness of the till is variable; it averages 25 feet and is known to exceed 165 feet locally in the meadows area. Stratified drift consists of sand, gravel, silt, and clay which has been transported by water; it is poorly to well sorted. The stratified drift was deposited in contact with the ice or as outwash in flood plains, deltas, and as fine sediment in lakes during and after the retreat of the ice.

Stratified drift deposits of varved silt and clay, as much as 300 feet thick in the meadows, occur in two troughs (fig. 4) which roughly parallel the sides of the basin and probably connect a few miles south of the New York State line. Perlmutter (1959, p. 25) has reported similar deposits of laminated clay continuous with those of New Jersey in southern Rockland County, New York. Because of their varved character and lack of marine fossils, the silt and clay are presumed

In the interval between 1927 and 1963 the average yearly total dissolved solids content of the Hackensack River in the upper area increased from 104 mg/l to 184 mg/l and the hardness calculated as calcium carbonate increased from 37 mg/l to 77 mg/l (analyses by the Hackensack Water Company). Some of the increased dissolved solids content resulted from cycling water through municipal and domestic sewage systems.

The Hackensack Meadows in the lower area of the basin are utilized for the disposal of 57 mgd of treated municipal sewage effluent and industrial waste, rich in nitrates and phosphates. During summer months, particularly when precipitation is deficient, brackish water from Newark Bay flows up the Hackensack River. The chloride concentration in Newark Bay is approximately 10,000 mg/l. In the late summer of 1961 concentrations as high as 4,000 mg/l were found in the Hackensack River as far north as Hackensack and concentrations of several hundred milligrams per liter occurred near the northern part of the area below New Milford. This high concentration of chloride makes the water in the lower Hackensack unsuitable for municipal and industrial processes although it is usable for cooling purposes.

Ground Water in Consolidated Rock

Stockton and Lockatong Formations

The Stockton Formation underlies a small area on the west side of the Palisades in the Hackensack River basin. Because of its limited areal extent in the basin and because it has hydrologic properties similar to those of coarser parts of the Brunswick Formation, the hydrology of the Stockton Formation is not discussed separately in this section.

The Lockatong Formation is thin and is known from only one exposure in the basin. No wells are known to penetrate it within the basin. Based on studies made elsewhere in New Jersey, the Lockatong can be expected to yield considerably smaller quantities of water than the finer-grained parts of the Brunswick Formation.

Brunswick Formation

Occurrence and Movement of Ground Water

Ground water in the Brunswick Formation occurs in a network of interconnected openings formed along joints, fractures, and solution channels. The intervening unfractured rock has negligible capacity to store and transmit ground water. The openings which contain ground water decrease in size and number with increasing depth below land surface. As some beds within the formation contain more openings than others, the ground-water system consists of a series of alternating tabular aquifers and aquicludes several tens of feet thick and dipping

to the northwest at approximately 10 degrees. The water-bearing fractures in each tabular aquifer are more or less continuous, but hydraulic connection between individual tabular aquifers is poor. These tabular aquifers generally extend downdip for a few hundred feet and are continuous along strike for thousands of feet.

In an areally extensive, homogeneous, and isotropic aquifer, drawdown caused by pumping a well is equal at all points equidistant from the pumped well. This is not true, however, in a consolidated rock aquifer, such as the Brunswick Formation, where water is stored in and transmitted through secondary openings, which generally have some preferential alinement and are better developed in some beds than they are in others. In the Newark area, Herpers and Barksdale (1951, p. 29) observed a drawdown in an observation well located 2,400 feet from a pumped well in a direction parallel to the strike of the beds, whereas no distinct drawdown was evident in observation wells 600 feet from a pumped well in a direction transverse to the strike. They also observed that as a consequence of heavy pumping, high-chloride water from Newark Bay intruded the aquifer farthest along the strike of the beds. Similar observations on the anisotropism of the Brunswick Formation have been documented by Vecchioli (1967) and Vecchioli and others (1969). Their pumping-test data indicate that the direction of highest permeability and of the movement of water in response to pumping characteristically parallels the strike of the beds. Therefore, well fields, wherever possible, should be designed with wells alined transverse to the strike of the beds in order to minimize interference.

Thickness and Distribution of Water-Producing Zones

Estimates of the thickness of the ground water producing zone in the Brunswick Formation have been based typically on review of drilling records and on the observation that when a well has not successfully tapped a water-yielding zone in the first 400 feet of drilling, water-yielding zones are not likely to be penetrated by drilling deeper.

The zone in the Brunswick Formation containing joints and fractures that are capable of storing and transmitting fresh water has been variously estimated to be between 200 and 600 feet thick (Herpers and Barksdale, 1951, p. 27; Greenman, 1955; Rima, 1955; Perlmutter, 1959; and Parker and others, 1964). The depth and distribution of water-producing zones in the Brunswick Formation were determined at Lansdale, Pennsylvania, by Rima (1955) who injected water into several wells and traced the flow of the injected water by means of a flow meter. Rima concluded that the Brunswick in the Lansdale area contains an upper water-table aquifer of low permeability occurring at depths of less than 250 feet below land surface; below this depth there are one or more artesian or semiartesian aquifers of high permeability, generally less than 20 feet thick each, and occurring at depths as great as 600 feet.